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Lieutenant Colonel Paul Darien Berg, son of ~~Paul F.~~ and ~~Gloria V. Berg~~, was born ~~March 26, 1961~~, in Sacramento, California. He is a 1983 graduate of the U.S. Air Force Academy in Colorado where he earned a Bachelor of Science degree in History and a commission as a Second Lieutenant. He completed Undergraduate Pilot Training at Williams AFB, Arizona in 1984 and is currently a Command Pilot with over 5,800 flying hours, mostly in bomber and reconnaissance aircraft. He earned a Master of Arts degree in Space Studies from the University of North Dakota in 1993 and a Master of Arts degree in Military History from the University of Alabama in 1998. He taught air power theory and employment at the Air Command and Staff College at Maxwell AFB, Alabama prior to entering Graduate School, Auburn University, in September 1998. He will resume teaching at Air Command and Staff College in 2001. He is married and is the father of three children.

DISSERTATION ABSTRACT

MEASURING U.S. AIR FORCE BOMBING EFFECTIVENESS

DURING ROLLING THUNDER

Paul Darien Berg

Doctor of Philosophy, August 6, 2001
(M.A., University of Alabama, 1998)
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Analyses of the 1965 to 1968 Rolling Thunder bombing campaign against North

Vietnam have not discussed Air Force bombing assessment methods or criteria in detail.

The tacit assumption has been that assessments were simplistic or otherwise inadequate,

but the evidence suggests the Air Force processes were richly complex. Based largely on

contemporary oral history interview audiotapes and other archival sources, this

dissertation examines Rolling Thunder bombing assessment from perspectives ranging

from Air Force flying units to the Joint Chiefs of Staff. Johnson Administration

perspectives are also compared with military viewpoints. An overview of the campaign's

objectives and strategy as they related to effectiveness measurement is also included.

Flying units emphasized quantitative data such as numbers of targets destroyed when evaluating bombing results. Units sought feedback from headquarters, but bomb damage assessment photography and other data proved hard to obtain. However, headquarters agencies demanded ever more intricate reports from flying units. Demands for more data did not always lead to better information. Headquarters staffs undertook complex analyses, using criteria such as numbers and types of targets struck, estimated civilian and military casualties, economic disruption, enemy resource diversion to defensive tasks, aircraft loss rate, morale, enemy willingness to negotiate, and propaganda content. Alternative criteria such as accuracy, numbers of sorties flown, and tons of bombs dropped, received less attention.

Air commanders complained about political restrictions imposed on bombing, but remained highly optimistic that success would follow as those restrictions were eased. Meanwhile, administration officials lost confidence in bombing's potential effectiveness. Air Force assessment criteria and methods were highly sophisticated, yet selectively applied. Commanders adapted their success criteria to accommodate a protracted war and found ways to emphasize the campaign's modest successes while downplaying problem areas. Both military and civilian officials often interpreted effectiveness indicators in ways consistent with their preconceived notions, proving able to draw diametrically opposed conclusions from the same information. Previous attempts to explain military officials' apparent slowness to recognize the campaign's failings have been inadequate, but an alternative explanation based on Thomas Kuhn's writings about paradigms has some value.

ASSESSING U.S. AIR FORCE BOMBING EFFECTIVENESS

DURING ROLLING THUNDER

Paul Darien Berg

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CHAPTER 1 - INTRODUCTION

The United States embarked haltingly upon Rolling Thunder. The first bombing missions against North Vietnam were reactions to specific incidents. Air raids had followed the August 1964 Gulf of Tonkin incident and more attacks conducted under a February 1965 bombing program named Flaming Dart had struck North Vietnamese territory to retaliate for specific Viet Cong (VC) attacks against U.S. installations in South Vietnam. Rolling Thunder's initiation in early 1965 marked a major policy change in that bombing became an ongoing Air Force and Navy effort rather than a series of tit-for-tat retaliatory raids. The original Rolling Thunder plans envisioned a limited and relatively brief operation. Senior American leaders had no idea the campaign would escalate drastically in intensity and drag on for over three years to become the longest sustained bombing campaign in history.

Rolling Thunder did not unfold according to a recognizable premeditated plan, but progressed through several improvised stages. Interdicting the movement of men and war materials through North Vietnam's transportation network was a perennial Rolling Thunder activity that continued at variable levels of intensity throughout the campaign. Poor flying weather during the winter months forced seasonal lulls in bombing each year. The campaign's first stage featured limited attacks against targets in the southernmost parts of North Vietnam. During 1965 and early 1966, the geographic area open to

bombing expanded northward and the number of targets approved for attack gradually increased. The 1966 campaign against the petroleum, oil, and lubricants (POL) system marked a distinct episode beginning June 29, 1966 and lasting several months. Emphasis gradually shifted to intensified attacks against a wider range of industrial, military, and transportation targets lasting through the fall of 1967. Rolling Thunder's final stage was quite distinct and began on April 1, 1968 with President Johnson's abrupt order to halt bombing north of the 20th parallel and confine attacks to the southern panhandle of North Vietnam. Two days later, the President further restricted bombing to below the 19th parallel. The President's November 1, 1968 order to halt all bombing of North Vietnam essentially ended Rolling Thunder, but sporadic attacks against targets just north of the Demilitarized Zone (DMZ) between North and South Vietnam did occur after that date.

The ill-fated campaign offers insights for those who contemplate air power solutions to military problems. The combination of Air Force and Navy air power initially seemed so overwhelming that the North Vietnamese could not possibly withstand it, yet there seemed to be a wide gap between bombing's expected and actual utility as an instrument of national policy. Senior American officials had confidently expected bombing to undermine North Vietnam's will and ability to attack South Vietnam, yet the enemy's surprisingly fierce Tet Offensive of 1968 demonstrated that three years of air attacks had not prevented Communist forces from preparing and launching a major assault throughout the South. President Johnson's order to curtail Rolling Thunder came within two months of the Tet Offensive's outbreak and seemed to acknowledge the bombing's failure.

The Tet Offensive traumatized Americans, but did not really mark a sudden revelation that Rolling Thunder was less successful than originally anticipated. Doubts about the bombing's ability to achieve its stated purposes had been growing since 1965, but the information upon which to assess the campaign's effectiveness proved resistant to clear interpretation. Almost everyone involved with Rolling Thunder was interested in determining how well the bombing was succeeding. The types of data they gathered and the ways they analyzed them revealed diverse beliefs about how best to assess bombing's usefulness as a national policy tool. There was no universally accepted standard for gauging success. Effective bombing seemed instead to be in the eye of the beholder.

The differing opinions reflected bombing's inherently political and controversial nature. As a form of warfare, bombing is a political act, the morality of which is obviously debatable, and the difficulty of predicting or proving its effectiveness amplifies the controversy. Policy makers need to link physical destruction with abstract political purposes. Essential preliminary steps include defining methods of collecting, interpreting, and reporting bombing data; choosing criteria correlated with bombing's success; and choosing measurable parameters related to those criteria. Simple statistics such as numbers of targets destroyed are insufficient, but devising measurements that show how destruction marks progress toward desired political goals rather than senseless violence is extremely difficult. Expectations of success typically run high when a bombing campaign begins, but evidence of progress can be slow to materialize. Quick, unambiguous signs of success are desirable, so unless bombing produces prompt and visible results consonant with accepted war aims, doubts arise as to its effectiveness and political support wanes.

Experience shows that bombing results beyond immediate physical damage are often less dramatic and more ambiguous than expected. Part of the gap between predicted and actual results can be explained by the criteria and methods used to measure results, but most historians have said little about how the U. S. Air Force (USAF) attempted to gauge the bombing's effectiveness.[1] Examining assessment criteria and methods within the Rolling Thunder context will be the purpose of this work.

Three items will comprise the remainder of this introductory chapter. The first will be an overview of the project's scope and the methodology to be used in addressing the topic. Next will be a brief summary of the arguments to be made. Finally, a few theoretical notes on bombing assessment will introduce key concepts.

A thorough account of Rolling Thunder is beyond the scope of this analysis. Rather than present a chronological history or a comprehensive campaign study, the investigation will focus on how the USAF assessed bombing effectiveness and will explore potential connections between the measurement methods used and the campaign's outcome. Criteria that might have been used to judge the campaign's results, but were mostly unused will also be examined.

The analysis will be based on the perspectives of a limited group of people, mostly military personnel who actually participated in Rolling Thunder or served on headquarters staffs that supervised the operation. The headquarters perspective will receive more

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[1] For example, John T. Smith, Rolling Thunder: The American Strategic Bombing Campaign Against North Vietnam, 1964 – 1968, (Walton on Thames, Surrey, England and St. Paul, MN: Air Research Publications, Phalanx Publishing, 1994), critiques the campaign in detail, but does not delve into effectiveness measurement.

attention than the combat flying unit perspective, partly because more headquarters source materials were available, but mostly because senior officials appeared to spend more effort gauging the campaign's progress. The discussion will emphasize the U.S. Air Force perspective, but the Navy played an extremely large part in the campaign and the Marine Corps also played a role. The fact that Admiral U. S. Grant Sharp was the overall commander of American forces in the Pacific – including Vietnam - assured a Navy voice in Air Force bombing assessments. Army, Navy, and Marine Corps representation on the Joint Chiefs of Staff (JCS) added an even stronger interservice element. Civilian officials in the Johnson Administration - especially Secretary of Defense Robert S. McNamara – wielded immense decision-making authority and exerted a profound influence on how the U.S. measured and interpreted Rolling Thunder's results. Consequently, the investigation will encompass their assessment ideas to the extent that those ideas related to USAF bombing effectiveness judgments.

The investigation will limit the perspectives of Rolling Thunder participants in terms of time. Identifying how participants evaluated bombing's results while the campaign was still in progress is an important area of inquiry. After Rolling Thunder, the knowledge of eventual American defeat and the fading of memories may have led participants to reappraise and perhaps attempt to justify their past actions. Therefore, official reports, Congressional testimony, and taped interviews dating from 1965 through the early 1970s have been used wherever possible to capture attitudes prevalent during and shortly after the campaign. Memoirs and other materials published later add insights and fill in gaps.

The topic will also be limited in other ways. Rolling Thunder was only one of several interlocking, contemporaneous bombing campaigns in Southeast Asia, but the concurrent aerial operations in South Vietnam and Laos will receive minimal attention. The nearly complete absence of U.S. ground combat in North Vietnam simplifies Rolling Thunder analysis because any target damage or other effects were presumably due to bombing. However, ascertaining bombing's effect on North Vietnam remains quite complex. Involuntary constraints such as availability of sources also limit the discussion. Intelligence gathering and analysis are central to effectiveness measurement, but security classification still excludes some documents from the public domain. The technical analysis of munitions effects is better treated elsewhere and will receive only passing attention, but the discussion will define bombing broadly to include rockets and bullets airplanes fired at North Vietnamese ground targets.

The investigation will begin by examining the political goals and military objectives Rolling Thunder was supposed to achieve and then continue with a cursory examination of the alternative strategies devised to achieve those objectives. Air Force bombing assessment entails information collection, interpretation, distribution, and use in decision-making within a hierarchical command structure so those activities form part of the analysis. Pilots and other members of flying units at the squadron and wing levels collected much of the photography, statistics, and other raw bombing data. Air Force units at levels ranging from squadrons to the Pentagon consolidated, interpreted, and reported those data according to various formal and informal procedures, sometimes basing their assessments upon indicators that varied between units and levels of command.

Reports, briefings, conferences, and other communication methods distributed those assessments through both official and unofficial channels. Information flowed both up and down the chain of command. The analysis will present senior Air Force and civilian officials' overall opinions about Rolling Thunder's effectiveness and describe how they reached their conclusions. Linking bombing assessment to a commander's decision making is difficult, but some examples will illustrate how senior officials used bombing assessments when choosing how to conduct the campaign. The discussion will also comment upon alternative explanations of why Air Force officials remained persistently optimistic about bombing's prospects and whether effectiveness measurement methods influenced the campaign's outcome.

This work will advance a number of arguments. The first point is simply that any examination of Rolling Thunder's effectiveness needs to be based on the campaign's stated purposes. Senior civilian and military leaders held similar, but not identical, views of the operation's goals and objectives. The divergences that did exist were a fundamental source of disagreements about how to chart progress toward success or failure.

Other disagreements arose because various people and organizations evaluated effectiveness differently. Some observers have contended that the military measured the air campaign's success by narrow criteria such as counting sorties flown and tons of bombs dropped, but Air Force bombing assessment was much more sophisticated than

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that.[2] Flying units applied multiple, overlapping assessment techniques including debriefing reports of aircrew observations, strike photography showing bombs exploding, and post strike reconnaissance imagery, but aircrews were prone to judge effectiveness differently than the intelligence (commonly shortened to "intel") personnel assigned to their own units. Disagreements between aircrews and intel about strike results were endemic, but did not significantly interfere with units' bombing assessment activities. However, stronger tensions developed between flying units and headquarters as headquarters staffs demanded increasing amounts of bombing data from units without reciprocating with the reconnaissance photography and other feedback units desired and requested. Flying unit personnel sometimes engaged in passive resistance to what they considered excessive or unreasonable headquarters demands for information.

Commanders, headquarters staffs, and senior civilian officials subjected data submitted by flying units to extensive analyses and published numerous reports about their conclusions. The analyses were sophisticated and well intentioned, but not based exclusively on rational, impartial considerations. Operations and intelligence representatives within headquarters staffs did not always agree about how to interpret data. Criteria such as sortie counts and bomb tonnages attracted little attention, but target system and transportation network analyses, diverting enemy resources to defensive tasks, enemy propaganda, and other indicators were subjects of exhaustive investigations.

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[2] For an example of judging success by sorties and bomb tonnages, see James Clay Thompson, Rolling Thunder: Understanding Policy and Program Failure (Chapel Hill, NC: The Univ. of North Carolina Press, 1980).

Before presenting evidence to support the preceding assertions, some theoretical

remarks about bombing assessment will introduce terminology and concepts to be

articulated more fully during subsequent chapters. The first step in assessing bombing

effectiveness is to define the term. No single definition existed during Rolling Thunder,

but a USAF plan for measuring air power effectiveness said, "To measure the

effectiveness of something means to determine, quantitatively if possible, the extent to

which it meets its objectives or goals, under specified conditions or in given situations."[4]

The definition is generic, but it provides a framework for analyzing bombing effectiveness.

In terms of the definition, the "something" to be examined is the U.S. bombing of North

Vietnam. "To determine, quantitatively if possible, the extent" refers to measurements

and will be the investigation's focal point. The "objectives or goals" are those the U.S.

government sought and the "specified conditions" are the political, military, and economic

environment relevant to bombing North Vietnam from 1965 to 1968.

One can judge bombing effectiveness by various criteria so a broad conceptual

overview will provide background for a specific discussion of Rolling Thunder. The

following taxonomy describes basic parameters relevant to many effectiveness

measurements. Such measurements are, however, resistant to interpretation because all

the parameters mentioned below - plus others not mentioned - complicate and qualify even

the most seemingly unambiguous data purporting to show how well a bombing campaign

is fulfilling its stated purposes.

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[4]Air University / Corona Harvest, "Plan for Measurement of Effectiveness of Airpower," K239.032-40, in USAF Collection, AFHRA, chap. 2, p. 1.

The schism between senior military and civilian officials' interpretations of bombing effectiveness was more profound than any disagreement within the military hierarchy. Optimism initially prevailed in both circles, but many civilian officials became increasingly disillusioned with bombing while military commanders continued to believe bombing could succeed if properly applied. Rather than impartially interpreting the data, both groups used some effectiveness measurements as polemical devices to support their own preconceived notions. Since the campaign ultimately delivered disappointing results, the civilian officials' skepticism may in retrospect appear to have been prescience, while the military officials' persistent confidence in bombing's efficacy may appear to have been a type of blindness, but such a simplistic conclusion would be misleading. Despite some faults, Air Force bombing assessment methods and criteria were generally systematic, well conceived, and creditable attempts to determine the campaign's results.

Previous explanations for the chronic civil-military disagreement about effectiveness and the campaign's disappointing overall results have emphasized institutional factors such as the awkward command structure, division of the North into route packages, interservice rivalry, and goal displacement – a phenomenon whereby the means to attaining a goal can become the goal themselves.[3] Those explanations are inadequate. The existence of what might be called an Air Force bombing paradigm can account for many military judgments about Rolling Thunder's effectiveness, but is still only a partial explanation for a complex phenomenon.

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[3] Thompson, Rolling Thunder cited all four factors. Smith, Rolling Thunder mentioned the first three factors.

The causal proximity between an attack and its various consequences is one way to characterize effectiveness. The discussion will label bombing consequences as first, second, or third order depending on how far they are removed from the bombing's physical effects. Bombing campaigns consist of many small actions blended together to produce larger results. First order bombing effects are those most directly caused by the bombing. They are immediate physical damage, are mostly of tactical importance, and are relatively easy to measure – at least in principle. Destroying a truck is an example of a first order effect. Completely destroying the intended truck means success, damaging it means at least partial success, and missing it completely means failure. Determining how an air strike actually affected a given truck may be difficult to do in practice unless persuasive evidence exists showing what happened when the bombs fell.

Second order effects are less directly caused by bombing, manifest themselves in relation to military objectives beyond the tactical level, and are more difficult to measure than first order effects. Consider the example of an aerial interdiction effort designed to inhibit enemy transportation. The extent to which blowing up trucks disrupts enemy activities by impeding supply movement would be an example of second order effectiveness, but deciding exactly what to measure in order to prove such a causal relationship requires judgment. In an idealized perfect campaign, cumulative first order effectiveness would lead directly to desired second order effects, but reality is more ambiguous. In the real world, first and second order effectiveness may not be closely correlated. Bombing might be highly effective in the first order sense of destroying many trucks, but if the enemy compensates by replacing destroyed trucks or transporting

supplies by alternative means, truck destruction may lack second order effectiveness because it would not curtail enemy transportation. Measuring second order effects such as interdiction requires detailed knowledge of enemy intentions, supply needs, and transport capabilities; information that is hard to obtain during wartime. Complete interdiction is practically impossible, but precluding the movement of only a modest percentage of materials may constitute success in some situations.

Third order effects are abstract and hard to measure conclusively except in retrospect because they occur in the minds of political leaders on both sides. Third order effectiveness might be indicated by the enemy government's acceptance of concessions such as ending support of an insurgency; however, the causal linkage between achieving major second order military effects such as interdicting supply movements and convincing an enemy government to accept peace terms can be tenuous. Predicting the types and magnitudes of first and second order consequences required to bring about a given third order effect depends on virtually imponderable psychological and political variables. Bombing can be highly effective both in first and second order terms, yet fail to produce desired third order outcomes. The specific interactions between different levels of effects are bewilderingly complex and hard to predict. A proper understanding of bombing's actual contribution to achieving national objectives requires cognizance of all three levels, but maintaining such a wide perspective is difficult. During Rolling Thunder, military leaders believed third order success would be built upon cumulative first and second order successes, but Johnson Administration officials hoped to find a short cut to third order success that minimized the destruction typically associated with first and second order

results. The contrasting perceived linkages between different orders of effects were a central issue dividing administration and military opinion during Rolling Thunder.

Analysts can severely misjudge bombing's first, second, and third order effectiveness because even the most rigorous logical analysis cannot account for random or unanticipated contingencies. Unexpected first order results of a single mission may become tremendously amplified when viewed from second or third order perspectives. During the 1991 Persian Gulf War, two F-117 stealth fighters attacked the Al Firdos bunker in Baghdad, Iraq, a facility American intelligence analysts had thought was a military command post. Video imagery from the strike plane suggested the bombs had successfully demolished the bunker. Almost immediately, however, journalists reported that the raid had also killed hundreds of civilians sheltered inside and was threatening to become an international public relations disaster. Shaken American political leaders circumscribed further strikes near Baghdad. The Al Firdos incident exemplified how unplanned third order repercussions could offset first order success and alter senior American officials' broader opinions about bombing effectiveness even during a resoundingly successful campaign.[5] During Rolling Thunder, Johnson Administration fears of heavy civilian casualties or other repercussions from misdirected bombs probably contributed to the tight restrictions imposed on bombing.

Bombing results can be described in other terms besides causal proximity. The degree or magnitude of an effect is clearly a fundamental variable. Degree can range from

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[5] Michael R. Gordon and Gen. Bernard E. Trainor, The Generals' War: The Inside Story of the Conflict in the Gulf, (Boston and New York: Little, Brown and Co., 1995), pp. 324-327.

slight target disruption to total destruction. Closely related to degree is a quality this paper will call "elasticity." Elastic effects are those that vary in close proportion to the amount of bombing performed. Inelastic effects manifest themselves to a similar degree regardless of the level of bombing effort applied. Effects may be elastic up to a certain point beyond which inelasticity sets in. For example, the degree of enemy resource diversion to road repairs generally varies with the number of bombs dropped on roads, but once an enemy has mobilized extensive resources to repair damaged roads, heavier or lighter attacks against the road network may begin to yield inelastic results if they no longer elicit proportionally large changes in the amount of resources the enemy assigns to road repair. One possible reason for decreasing elasticity might be that repair crews, antiaircraft gunners, and other groups may become more efficient as they gain experience. Neither elasticity nor inelasticity is an inherently desirable attribute. Elastic effects can help the attacker gain the initiative and control the costs the enemy must bear, but effects that impose unacceptable costs on the attacker (such as too many aircraft shot down) may not be worth achieving. Inelastic effects that impose intolerable costs on an enemy might theoretically leverage the effectiveness of a modest bombing effort. Alternatively, an enemy may become inured or acclimated to the cost, thus reducing an intensified campaign's ability to impose additional costs.

Effects are also distributed over a certain physical area and across time. Spatial distribution can range from pinpoint to widespread coverage. Precise bombing that destroys intended military targets without damaging nearby areas is generally considered preferable to indiscriminate or "carpet" bombing that scatters destruction over wide areas.

Precision bombing was ostensibly an American specialty in World War II, but despite the official emphasis on accuracy, precision was seldom attained. Accuracy had improved somewhat by Rolling Thunder – especially when small numbers of newly developed precision-guided munitions became available. However, successful attacks against large or widely dispersed targets such as industrial complexes may require wide area coverage.

Temporal distribution is more convoluted. Two time-related dimensions this discussion will label "duration" and "lag" apply to bombing effects. An effect's desired time duration can vary widely. Roads blocked by bomb craters can be reopened within hours, but major road or railroad bridges may take months to rebuild. Long effect duration does not necessarily mean greater effectiveness than short duration. Air planners may want only a transient disruption or they may want to deny the use of a facility for a long time. The lag between an attack and the manifestation of effects is another important time dimension - especially for second or third order effects. The truck hit by a bomb is destroyed instantly, but a lag of months or longer may pass before a successful interdiction effort leads to enemy shortages of critical supplies or persuades enemy leaders to sue for peace. Policy makers usually prefer quick results and may become impatient if bombing takes longer than expected to yield desired second or third order effects.

Another time-related characteristic applies to the bombing assessment process itself rather than to the effects bombing produces. Effectiveness measurement is more than a backwards-looking analysis of what has already happened. The process is dynamic and cyclical, looking both to the past and future. For example, the same bomb damage assessment (BDA) photo that depicts how previous bombing has damaged a target can

also help commanders make targeting decisions and plan future attacks. Timely receipt of data such as recce (reconnaissance) photos keeps commanders updated about the past and prepared to select future targets. Effectiveness measurement lies at the juncture between assessing past results, controlling ongoing attacks, and planning future operations.

Bombing can seek either positive or negative objectives in that it can be intended to bring about desired results or prevent undesired ones. Positive objectives are prominent during wars fought for relatively unlimited ends, but negative objectives may gain heightened prominence during wars fought for limited objectives. In World War II, Americans firebombed Japanese cities while pursuing the positive aim of unconditional surrender. There were few restraints imposed on the bombing because practically any action that promised to hasten surrender was desirable, but negative objectives did exist. For example, U.S. leaders wanted to avoid killing the Emperor or destroying cultural sites because such actions might have hardened Japanese military resistance. Rolling Thunder featured a very different balance between positive and negative objectives. The U.S. wanted to undermine the Hanoi regime's will and ability to attack South Vietnam, but did not want to devastate the North or trigger Chinese or Russian entry into the war.

The two types of objectives are not equally measurable. Positive results like outright devastation are comparatively easy to detect; however, proving bombing prevented some undesired outcome is more problematic. Claiming that a carefully regulated bombing campaign against North Vietnam was successful because it had kept the Chinese and Russians out of the war, but that a less restrained campaign would have failed because it would have led to intervention is an essentially unprovable assertion.

Perhaps those nations would have stayed out of the war in any event. Effectiveness claims founded on events bombing supposedly prevented are inherently speculative.

Another dichotomy between positive and negative objectives can arise when one tries to judge effectiveness by what bombing actively achieves compared to the null hypothesis of what might have happened without any bombing. Rolling Thunder featured periodic bombing pauses and examples of null hypothesis reasoning were fairly common. Analysts said interdiction was effective in a positive sense because it destroyed numerous vehicles, supplies, and bridges. If enemy supply movements increased after bombing stopped, analysts could claim continued bombing would have prevented those increases. Similarly, commanders argued interdiction bombing must continue without interruptions in order to deprive enemy forces of ammunition and thereby minimize friendly ground force casualties. If bombing were halted, commanders could blame any increased casualties on the halt. Such assertions are difficult to prove, but their very unprovability can be an advantage to bombing advocates because disproving them is also difficult.

Some measurements that purportedly show effectiveness are not really effectiveness indicators at all. Tons of bombs dropped, numbers of targets attacked, and numbers of sorties flown are examples. The first two parameters have obvious meanings, but a brief definition of the third is warranted. A sortie was one flight by an aircraft. Strike aircraft normally flew in formations rather than singly. Sorties were the building blocks of bombing missions comprised of a number of planes flying in one or more formations to attack a target. Missions might include anywhere from one to dozens of sorties. Bombs dropped, targets attacked, and sorties flown are particularly easy to count,

but they reflect a campaign's magnitude more than its effectiveness. Nevertheless, when policy makers deliberately design a bombing program to apply "pressure" against an adversary, numbers that seem correlated with the amount of pressure applied can acquire the appearance of effectiveness indicators. Achieving the desired amount of pressure might become a desired outcome in its own right whether or not that pressure contributes to results more properly describable as effectiveness indicators.

Efficiency is a term often associated with effectiveness, but the two concepts are different. Efficiency implies a favorable ratio of results obtained to effort expended. Destroying more targets with fewer bombs reflects efficient use of ordnance, but does not always equal improved effectiveness. Accurate bomb delivery is normally more effective than inaccurate bombing, but precise hits on the wrong target are ineffective. Detailed knowledge about the enemy is a prerequisite to effective bombing, but timely, accurate intelligence is often unavailable. Analysts may mistakenly count destroyed decoy targets as real targets. Even if bombing destroys vital targets, intelligence may not be able to recognize that fact.

The terms data, information, and intelligence crop up constantly during effectiveness measurement, but they are not interchangeable. For the purposes of this investigation, data are raw numbers, facts, or statistics that require processing and interpretation before they become meaningful. Information is a useful insight gained from data analysis. Intelligence is a term applied to data, but also to information or the people who handle it. Intelligence officers attempt to collect and interpret bombing data in ways that will be useful to aircrews, commanders, or other officials.

Information and intelligence reflect a conscious intent and are the products of deliberate choices. Merely collecting or reporting data does not prove that someone intended it to be a measure of effectiveness. For example, Rolling Thunder air commanders routinely kept statistics on sorties flown and numbers of targets struck. Divining the intent of those who kept the statistics requires examining how they used and interpreted the material. Air commanders viewed some statistics as management tools rather than success indicators. When the Johnson Administration limited the number of sorties and targets allowed, commanders counted both items to ensure compliance with the restrictions. They might have deemed the restrictions counterproductive or irrelevant to effectiveness. However, Air Force officials might also discuss those statistics in ways suggesting they did indeed consider them effectiveness indicators. Reconstructing the criteria by which officials judged bombing effectiveness therefore requires subjective interpretations extending beyond the charts, graphs, and tables found in documents describing the campaign. Such interpretive insights can come from oral history interviews, end-of-tour reports, and other contemporary sources. The following chapters will explore these themes in greater detail.

CHAPTER 2 – ROLLING THUNDER OBJECTIVES AND STRATEGIES

The definition of effectiveness presented in Chapter 1 specified the need to match results achieved against the goals or objectives sought. This study will call the political purposes guiding a war "goals" and the military ends derived from those goals "objectives." A goal's political aspect gives it a predominantly third order quality while an objective has a second order nature, but the categories are not totally distinct. Goals and objectives both define what is to be accomplished. Strategies define how to achieve goals or objectives. Divergences between the ways civilian and military leaders conceptualized Rolling Thunder's goals, objectives, and strategies were a fundamental source of disagreements about how to measure campaign's success or failure.

Political Goals and Military Objectives

Rolling Thunder's intended results marked the standards against which to judge its effectiveness. American goals formed a hierarchy of desired outcomes wherein political goals formed the basis for military objectives. Political goals were limited and marked as much by negative outcomes to be prevented as by positive results to be achieved. President Lyndon Johnson wanted to stop Communist expansion and maintain South Vietnamese independence without escalating the war into a larger conflict involving China

or the Soviet Union.[1] He hoped to persuade North Vietnam to negotiate a settlement

rather than continue fighting. The President emphatically ruled out sweeping intentions

such as forcing the North to surrender or overthrowing its government. American

political goals remained nearly constant throughout the campaign.

Limited political goals translated into similarly limited military objectives, which

General Earle Wheeler, Chairman of the Joint Chiefs of Staff throughout Rolling Thunder,

said were "to blunt the increasingly successful Communist advance in South Vietnam; to

seize the initiative from the enemy; eventually to cause the Communists to cease their

aggression in South Vietnam; and finally, to assist South Vietnam in its development as a

viable and independent nation."[2] The objectives emphasized results in South Vietnam,

where countering the North Vietnamese backed VC insurgency was a primary concern.

American air and ground forces worked together in South Vietnam, but not in the North.

The North undermined the South's internal security by supporting the VC guerrillas and

infiltrating regular North Vietnamese Army (NVA) units, but American options for

attacking the source of that support were voluntarily circumscribed. The President

rejected a ground invasion, leaving air power the only means of reaching places beyond

artillery range from the coast or the South Vietnamese border.

Military commanders defined specific air objectives based on the close connection

between bombing the North and defending the South. From his Hawaiian headquarters,

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[1] Robert S. McNamara with Brian VanDenMark, In Retrospect: The Tragedy and Lessons of Vietnam, (New York: Times Books, 1995), pp. 173-174.

Admiral U. S. Grant Sharp, commander in chief of U.S. military forces in the Pacific

(CINCPAC) from June 1964 through July 1968, served as the field commander in charge

of the war in Southeast Asia. His headquarters published a Rolling Thunder report that

stated, "The overall objective of the air campaign was to reduce, to the maximum extent

feasible, NVN's [North Vietnam's] capability to support and direct the insurgency in SEA

[Southeast Asia]."[3] Specific components of the overall air objective were, "To apply

steadily increasing pressure against North Vietnam to cause Hanoi to cease its aggression

in South Vietnam" and to "[m]ake continued support of the Viet Cong insurgency as

difficult and costly as possible."[4] As American ground troops flooded into the South in

1965, protecting and supporting them became air objectives of particular importance.

Measuring Rolling Thunder's success in achieving such objectives would not be

easy because the air objectives represented a hazily defined indirect approach to the war in

the South. Pressuring Hanoi to "cease its aggression" was an unambiguous third order

result, but how should "pressure" be measured? Phrases like "the maximum extent

feasible" and "as difficult and costly as possible" were subject to multiple interpretations

and the magnitude of the results envisioned was not specified. Further complicating

matters was the American belief that the VC guerrillas were under North Vietnamese

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[2] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 2, Aug. 16, 1967, p. 125. (Cited hereafter as Senate Preparedness Subcommittee)
[3] Headquarters PACAF, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, July 1965 - December 1966," p. 24. (Cited hereafter as "CHECO Report" followed by title)
[4] CHECO Report, "Rolling Thunder, January 1967 - November 1968," p. 1.

control, so pressuring the VC would influence Hanoi and *vice versa*. The actual

relationship between the two enemy entities was more ambiguous and subject to change.

Admiral Sharp endorsed the air objectives, but carried his analysis one step further

by outlining three basic "tasks," the performance of which he thought would achieve the

overall air objectives, namely,

> (a) To reduce the flow of external assistance being provided to North
> Vietnam.
> (b) To destroy those military and industrial resources that contribute most
> to the support of aggression; and
> (c) To harass, disrupt, and impede movement of men and materials into
> South Vietnam.[5]

Although he listed them as discrete items, "The three tasks were interrelated and

had to be accomplished simultaneously for maximum effective results" and "while ...

certain operations would be more productive than others, concentration on any one at the

expense of the others would reduce the overall effectiveness of air operations."[6] The

"tasks" contain some hints of an air strategy because they suggest how to achieve

objectives, but they can also be interpreted as implied or subsidiary air objectives.

Careful balancing and a methodical approach were hallmarks of CINCPAC's air

tasks. Admiral Sharp's vision of Rolling Thunder sought to create a favorable

environment for South Vietnamese independence by keeping out foreign aggression. The

first air task entailed closing the seaports and railroads that brought war materials from

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[5] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 5. The tasks were worded somewhat differently at different times. See also CHECO Report, "Rolling Thunder, July 1965 - Dec 1966," pp. 24 and 69. See also Headquarters PACOM, Operations Division, Rolling Thunder Digest, all vols., p. 2. (Cited hereafter as "Rolling Thunder Digest" followed by title)
[6] CHECO Report, "Rolling Thunder, July 1965 - Dec 1966," p. 25. See p. 69 for a similar statement.

China and the USSR into North Vietnam. The second air task of destroying North

Vietnamese industry would complement attacks against ports and railroads by further

reducing the available supply of war materials. Those two tasks would be most effective

at reducing movement of men and supplies to South Vietnam, but the admiral's third air

task involved an aerial interdiction campaign against enemy transportation routes.

Although "less productive of meaningful destruction,"[7] interdiction would further hamper

enemy ability to support military forces in the South.

Military commanders distinguished between reducing an enemy's physical capacity

to fight and undermining his morale or psychological resolve to continue fighting.

Admiral Sharp envisioned a systematic approach to impairing enemy delivery of men and

materiel to South Vietnam by undermining the North's ability to wage war, but did not

claim Rolling Thunder could break the North's will to fight. As he later explained, "The

correct objective would be, in my opinion, the traditional objective of airpower when used

against an enemy is to beat his economy down so that he is no longer capable of carrying

out the war."[8] Improving South Vietnamese morale was also peripheral to CINCPAC's

plans. Sharp reasoned that if the South were adequately insulated against incursion, the

Saigon government would presumably be able to consolidate control of its own territory

with American assistance and later become self sufficient, but he did not present bombing

as a way to strengthen South Vietnam's will to win.

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[7] CHECO Report, "Rolling Thunder, July 1965 - Dec 1966," p. 69.
[8] Adm. U. S. G. Sharp, Oral History Interview (hereafter abbreviated as OHI) transcript, Feb. 19, 1971, K239.0512-409, in USAF Collection, AFHRA, p. 24.

Admiral Sharp's list of required tasks reflected his understanding of American military objectives, but his civilian superiors in Washington envisioned somewhat different Rolling Thunder air objectives. Fearful of widening the war, the Johnson Administration repeatedly disapproved Sharp's plan to cut the flow of Soviet and Chinese assistance to North Vietnam. The port of Haiphong was the primary entry point for war supplies, but hitting a Soviet ship during an air strike was a risk the President found unacceptable. The military recommended mining the harbor to exclude shipping, but the administration found that option equally unpalatable. The administration thus rejected much of Sharp's first air task of curbing North Vietnamese war imports.

Conversely, Secretary of Defense Robert McNamara wanted to go beyond CINCPAC's recommendations in other areas, adding the new objectives that "these air operations would raise the morale of the South Vietnamese people who, at the time the bombing started, were under severe military pressure"[9] and "demonstrate to South Vietnam, North Vietnam, and the world the U.S. commitment to see this thing through."[10] The President's National Security Advisor McGeorge Bundy explained, "The object would not be to 'win' an air war against Hanoi, but rather to influence the course of the struggle in the South."[11] The Johnson Administration's reluctance to block war imports, desire to bolster South Vietnamese morale, and wish to demonstrate U.S. resolve contributed to a divergence between the civilian and military visions of the air war's

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[9] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 275.
[10] Secretary McNamara's Rolling Thunder review, July 30, 1965, in U.S. Department of Defense, United States - GVN Relations. (Washington, D.C.: Gov't Printing Office, 1972), IV.C.3, p. 136. (Cited hereafter as "Pentagon Papers")

purposes. Admiral Sharp later remarked, "The national objectives as I saw them and the national objectives as were directed from Washington were two different things."[12]

Contending Strategies

Disagreement about objectives carried over into military strategy. Superficial agreement that bombing's results would manifest themselves primarily in the South masked deeper rifts between the administration and military leaders. For a brief time in early 1965, civilian and military officials hoped a modest bombing program alone might persuade Hanoi to negotiate an end to the insurgency, but those hopes quickly evaporated. South Vietnam seemed headed for inevitable collapse within months unless drastic steps were taken to counter the VC's steady gains on the ground. Policy makers concluded that an air campaign against the North and a ground campaign in the South would both be required to stabilize South Vietnam, but disagreed about the proper relationship between those two activities.

The military did not claim bombing could win the war independently, but instead advocated coordinated air, land, and sea operations of which Rolling Thunder and the deployment of ground troops "comprised interrelated elements of a broad strategy"[13] containing both offensive and defensive aspects. American military strategy included three elements. In the North, the U.S would "[t]ake the war to the enemy by unremitting but controlled and selective application of United States air and naval power." In the South,

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[11] Memo from McGeorge Bundy to President Johnson, Feb. 7, 1965, Pentagon Papers, IV.C.3, p. 36.
[12] Sharp, OHI transcript, p. 24.

the U.S. would "[s]eek out and destroy communist forces and infrastructures by expanded, offensive military operations." Meanwhile, a nation building effort would "[e]xtend the secure areas of South Vietnam by military operations and assist the government of South Vietnam in building an independent, viable, non-communist society by civic actions coordinated with military operations."[14] Since the North infiltrated men and supplies through Laos, air interdiction against the so-called Ho Chi Minh trail system was inextricably linked with Rolling Thunder, but complex political considerations led American policy makers to segregate the Laotian campaign into geographically discrete air operations such as Barrel Roll and Steel Tiger. The North also smuggled some war supplies through Cambodia. The bombing operations directed against those areas are mostly outside the scope of this investigation.

Commanders considered military operations in South Vietnam a strategic defensive since the enemy could attack at will from sanctuaries in Laos and Cambodia, but U.S. ground forces were not normally allowed to pursue them across international borders. Although U.S. and South Vietnamese forces often took the tactical offense in the South, the North Vietnamese and their Viet Cong allies held the initiative and could control the amount of ground fighting. If threatened with a serious defeat, they could withdraw, reconstitute their forces, and await a more opportune moment to resume combat.

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[13] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 125.
[14] Rolling Thunder Digest, all volumes, p. 2. See also Adm. U. S. G. Sharp, and Gen. W. C Westmoreland, Report on the War in Vietnam (as of 30 June 1968), (Washington, D.C.: U.S. Gov't Printing Office, 1969), p. 6.

Admiral Sharp called Rolling Thunder (and related operations in Laos) the

offensive part of the strategy whereby "the enemy is forced to react at places and times of

our choosing."[15] Vigorously bombing the North would give the U.S. some control over

the war's tempo. The admiral insisted that maintaining the air offensive was vital because,

"No war has ever been brought to a successful conclusion by defensive action alone."[16]

Military opinion asserted that holding the enemy at bay in the South merely prevented

American defeat, while the air offensive held the promise of victory.

At first, some administration officials concurred with the military view that

bombing the North might be the primary way to win in the South. Just before resigning in

early 1965, Central Intelligence Agency (CIA) Director John McCone said, "forcing

submission of the VC can only be brought about by a decision in Hanoi." As the U.S. sent

ground troops into South Vietnam and using them to pursue and attack the VC and NVA

troops, McCone urged a corresponding bombing intensification, saying: "We must hit

them [North Vietnam] harder, more frequently, and inflict greater damage. ... This ...

must be done promptly and with minimum restraint."[17] If Hanoi were the underlying

source of VC strength, then bombing the North would be a more effective way to defeat

the insurgents than fighting them on the ground in the South.

After CIA Director McCone's departure, civilian policy makers collectively drifted

farther away from the military's view of how Rolling Thunder related to the war in the

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[15] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 7.
[16] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 7.
[17] Memo from CIA Director McCone to Secretary Rusk, Secretary McNamara, McGeorge Bundy, and Ambassador Taylor, April 2, 1965, Pentagon Papers, IV.C.3, p. 92.

South. President Johnson's decision to deploy U.S. ground forces inexorably relegated

bombing the North to a secondary supporting role. Fighting and dying American ground

troops occupied center stage, and pressure mounted to use aircraft to attack targets

directly related to combat in South Vietnam rather than distant targets in North Vietnam.

Secretary of Defense McNamara saw bombing not as the way to victory, but as support to

the ground fighting, asserting, "the final decision in this conflict will not come until we and

our allies prove to North Vietnam she cannot win in the south. The tragic and long

drawnout character of that conflict in the south makes very tempting the prospect of

replacing it with some new kind of air campaign against the north. But however tempting,

such an alternative seems to me completely illusory."[18] McNamara doubted the air

offensive could decide the war, placing his hopes instead on winning through a prolonged

ground defense of the South, supplemented by bombing in the North. He thought the

resulting war of attrition would eventually sap North Vietnam's will to continue fighting

and compel the Communists to negotiate. Deciding whether Rolling Thunder would be

the main offensive thrust or a holding action to support a protracted ground defensive

divided civilian and military thinking for the remainder of the campaign.

Notwithstanding disagreements about objectives and strategies, the Rolling

Thunder missions forming the building blocks of the contending strategies consisted of the

same two basic types - planned strikes against fixed targets and armed reconnaissance to

interdict transportation routes. Aircrews flying missions against fixed targets knew before

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[18] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 282.

takeoff exactly which primary or alternate target they were supposed to bomb. Detailed

planning and preparation included studying aerial photos of targets and their surroundings.

Air planners divided fixed targets into various numbers of categories. Eventually,

CINCPAC settled on six standard categories consisting of electrical power facilities; war

supporting industries; transportation facilities; military complexes; petroleum, oil, and

lubricants (POL); and air defense systems.

Armed reconnaissance missions were not assigned any particular primary target,

but searched assigned enemy-held areas for targets of opportunity that met prescribed

criteria. Pilots patrolled roads, railroads, and waterways within the designated area,

attacking trucks, trains, boats, or other vehicles seen traveling along them. Orders

sometimes specified the transportation vehicle type authorized for attack each week and

prohibited bombing other types.[19] Aircrews were also permitted to bomb supply caches,

antiaircraft guns, or other military targets of opportunity they found within their assigned

area provided those items were not designated as fixed targets. The degree of success

typically depended on familiarity with the search area and the possession of a certain

knack for spotting camouflaged items. Pilots struck some relatively unimportant

preplanned backup target if they found no suitable vehicles to bomb. Armed

reconnaissance sorties were much more numerous than fixed strike sorties, but the

dividing line between mission types was not always firm. For example, depending on their

location and importance, bridges might be considered either fixed targets or armed

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[19] John B. Nichols, and Barrett Tillman, On Yankee Station: The Naval Air War over Vietnam, (Annapolis, MD: Naval Institute Press, 1987), pp. 22-23.

reconnaissance targets. Large bridges near Hanoi or Haiphong were fixed targets, but the myriad small bridges scattered along the roads to South Vietnam were normally fair game for armed reconnaissance missions.

Much as they disagreed about the proper relationship between air and ground operations, policy makers agreed both bombing mission types were needed, but disagreed about how to blend them into a suitable air strategy. Selecting targets and deciding how vigorously to bomb them was at the heart of the strategy dispute between the Johnson Administration and the military. The dispute reflected contrasting views of what constituted effective bombing.

President Johnson's intention was to find the minimum amount of bombing needed to attain his political objectives. According to Secretary McNamara's memoirs, the massive late 1950 Chinese intervention in the Korean War and beliefs that Southeast Asia was just another "front" where Chinese power had to be "contained" exerted a powerful restraining influence on administration bombing strategy formulation. McNamara recalled that when the JCS recommended heavier attacks against targets in Hanoi, Haiphong, and near the Chinese border in 1965, "The president and I rejected their request, in part because we doubted such attacks would significantly impair the Vietcong's ability to persevere in the South or persuade Hanoi to desist, but also because such moves would increase the risk of a confrontation with China, as had happened in Korea only fifteen years before." He also stated that fear of Chinese intervention "was a concern, among

other reasons, that led us to oppose repeated recommendations over the next four years

for a more rapid intensification of the air war."[20]

Secretary McNamara later acknowledged those intervention fears were greatly

exaggerated. Writing long after the war, he cited some memos he had sent to the

President in late 1965 in which he had explained how military actions, including "[a]ny

decision to continue the program of bombing North Vietnam," needed to be considered in

relation to the larger goal of containing China. McNamara retrospectively lamented that

the memos exemplified the

> totally incorrect appraisal of the 'Chinese Threat' to our security that
> pervaded our thinking. Among other shortcomings, they [the memos] took
> no account of the centuries-old hostility between China and Vietnam
> (which flared up again once the United States withdrew from the region) or
> of the setbacks to China's political power caused by the recent events in
> India, Pakistan, and Indonesia ... And yet, as far as I can recall and the
> record indicates, they reflect the views of all, or almost all, senior U.S.
> policy makers. Here again, the lack of expertise and historical knowledge
> seriously undermined U.S. policy.[21]

During Rolling Thunder, McNamara's worries about possible Chinese reactions

influenced the administration's decision to impose heavy political restraints on the

bombing. Secretary of Defense McNamara recalled how he, Secretary of State Dean

Rusk, and others "urged that the bombing program be kept under tight control – and more

limited than the [joint] chiefs [of staff] wanted – to minimize the risk of Chinese

intervention."[22] Officials were also hypersensitive to civilian casualties so another

rationale for bombing restrictions was to minimize civilian casualties by ensuring only

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[20] McNamara, pp. 218, 213 and 109.
[21] McNamara, pp. 218-219.

"military targets" were struck. The President therefore conducted the bombing with caution. Retaining extremely tight control of operations, he began bombing on a small scale and then approved a growing list of targets spread over expanding portions of enemy territory in what was called a "graduated" bombing strategy.

The President approved bombing as if he were buying cloth by the yard. Incremental approvals to continue under existing limitations or change the program's limitations received sequential designations consisting of the letters "RT" (for Rolling Thunder) followed by a number. The President also changed some program parameters without designating a new RT number. The first four approved bombing programs were cancelled, but on March 2, 1965, RT-5 became the first one that actually flew. A given RT program remained valid anywhere from a single day initially (such as RT-5) to months during the campaign's later stages. Rolling Thunder 57 remained in effect from the summer of 1967 until early 1968 and RT-58, the last of the series, continued from the summer of 1968 until the campaign ended November 1st.

Theoretically, bombing administered in judicious doses at the proper times would yield precisely calculated pressure against the enemy. The belief that the fear of heavier bombing to come was at least as persuasive as any physical damage actually inflicted dovetailed nicely with the President's gnawing fear of Sino-Soviet intervention, leading him to impose several types of controls on armed reconnaissance and fixed target attacks.

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[22] McNamara, p. 229.

Establishing geographic boundaries within which bombing was permitted was a fundamental bombing restriction. Geographic controls were defined by latitude, distance from the Chinese border, "route package," or radius from a city's center. The 17° North latitude line divided the two Vietnams and other latitudes were commonly used as boundaries south of which bombing was permitted. Bombing south of the 19th or 20th parallel in the area called the southern panhandle represented a low level of pressure while bombing further north implied increasing pressure. The Chinese border was a sensitive area within which the administration thought bombing risked provoking a reaction, so the President ordered a buffer zone parallel to the border within which aircraft could not fly. The zone's width varied, but was typically about 25 to 30 miles.

The route package system that divided North Vietnamese territory into armed reconnaissance zones was the campaign's most pervasive geographical dimension, but the Johnson Administration did not create the system. Instead, military commanders developed the route packages (also called route packs or abbreviated RP) and used them to apportion armed reconnaissance responsibilities among different services and commands. Route Package 1 was immediately adjacent to the DMZ, and the other packages were numbered sequentially from south to north. There were six route packages initially, but a seventh appeared when Route Package 6 in northeastern North Vietnam was divided into two halves designated 6A and 6B in April 1966. The final arrangement thus featured zones numbered 1 through 5 plus 6A and 6B (roman numerals were also used). Segregation into exclusive Air Force and Navy zones was loose at first, but became more systematic as the campaign continued. As each edition of a Pacific

Command (PACOM) quarterly report explained, "Rolling Thunder (RT) armed reconnaissance areas, referred to as Route Packages (RP) were designed for the purpose of fixing responsibility for target development, collection of intelligence data and target analysis under the overall control of CINCPAC."[23] The Navy supervised Route Packages 2, 3, 4, and 6B. Army General Westmoreland, Commander of the U.S. Military Assistance Command Vietnam (COMUSMACV), usually controlled Route Package 1 adjacent to South Vietnam through his air component commander (2nd Air Division (later called Seventh Air Force) Commander General Joseph Moore until July 1966, then Seventh Air Force commander General William Momyer through 1968). The Air Force gained control over Route Packages 5 and 6A in northern North Vietnam. Route packages applied primarily to armed reconnaissance rather than fixed target missions. Either Navy or Air Force planes might be assigned to bomb any given fixed target in any route package, but Navy planes usually handled targets in coastal areas while Air Force planes typically dealt with places further inland.

The area around Hanoi and Haiphong was the heart of North Vietnam. Attacks there presumably applied the most pressure against the enemy, but risks of killing civilians, damaging embassies, or otherwise arousing international ire called for the utmost discretion. The President ordered the designation of concentric circular areas called prohibited zones and restricted zones around Hanoi and Haiphong, the North's two largest cities. The prohibited zone was the innermost circle around each city within which

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[23] Rolling Thunder Digest, all vols., p. 2.

no strikes were permitted. Air strikes in the larger restricted zone circle required White House or Pentagon approval. The sizes of the zones changed occasionally, but Hanoi had larger circles around it than Haiphong. President Johnson thought graduated pressure circumscribed geographic areas would persuade the North Vietnamese to come to terms while keeping the war below the threshold that might trigger Sino-Soviet intervention.

Other controls affected types and numbers of targets, numbers of sorties flown, and types of ordnance dropped. The President personally decided which fixed targets to strike and how many sorties to fly, assuming that those parameters further modulated the pressure applied to the North. He often made those decisions at the famous Tuesday luncheons at the White House. Air units enjoyed considerable freedom to choose ordnance, but did face some varying restrictions. For example, 2,000-pound bombs sometimes required special approval. The administration also permitted napalm and cluster bombs (CBUs) to be used in South Vietnam, but restricted their use in North Vietnam - possibly because of fears such anti-personnel weapons might inflict excessive enemy civilian casualties.[24] Oddly, the policy implied that the administration was less worried that those same munitions might harm South Vietnamese civilians.

Administration restrictions may have been extensive, but weather and terrain may have imposed the heaviest restrictions of all on air strikes and bombing assessment. Pacific Air Forces (PACAF) Commander Gen. John Ryan stated outright that, "The

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[24] Nichols and Tillman, pp. 24-25.

largest problem we faced out there in the air war was weather."[25] The annual monsoon

cycle dominated the North Vietnamese climate. Although the term "monsoon" connotes

seasonal tropical rains, the term actually refers to the prevailing wind direction. The

southwest monsoon prevailed from about April to September and brought generally good

flying weather to North Vietnam. The northeast monsoon during the winter months

brought frequent fog and low clouds. A variable transition period between the two

seasons happened in the March – April period and again in September – October. The

worst northeast monsoon weather often affected the northernmost part of North Vietnam,

severely limiting bombing in the Hanoi – Haiphong area. January through March 1968,

the time of the Tet Offensive, coincided with the worst flying weather of the entire

campaign. The Air Force and Navy used radar controlled bombing techniques to partially

counteract bad weather, but clouds often precluded reconnaissance or post strike

photography. Radar bombing had some value against fixed targets, but poor visibility

severely constrained armed reconnaissance flights looking for vehicles along

transportation routes. When Hanoi area weather was bad, many sorties diverted to Laos

or Route Packages 1, 2, 3, or 4 where weather was sometimes better.

Terrain had mixed effects on bombing and bombing assessment – particularly for

armed reconnaissance operations. Mountain ranges channeled ground traffic into passes

American planners regarded as "choke points" where vehicles would be most vulnerable

to interdiction. The limited road and railroad infrastructure also helped concentrate traffic,

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[25] Gen. John D. Ryan, OHI transcript, May 20, 1971, K239.0612-476, in USAF Collection, AFHRA,

but the North Vietnamese constantly expanded their transportation networks – especially

roads and trails. Rough terrain and numerous waterways forced the enemy to rely on

bridges, but bridges were hard to hit and the enemy diligently repaired and built bypasses

around destroyed ones. Dense jungle vegetation provided countless hiding places, making

targets elusive and bomb damage difficult to assess from the air.

Military leaders were cognizant of North Vietnam's climatological traits, but

advocated an air strategy different from the President's and based on the idea that

bombing was much more effective if administered quickly in large doses than slowly in

small doses. The Joint Chiefs of Staff (JCS) members unanimously favored a "sharp

blow" involving intense bombing of numerous targets throughout North Vietnam "to bring

the maximum effectiveness of airpower to bear," advising "the significant targets within

the six target systems be hit in as short a time as possible, and that then an effort be

maintained to keep them out of action."[26] The initial JCS recommendation was to use

strategic air attacks to destroy 94 vital North Vietnamese facilities within a few weeks.

According to an Air Force report, PACAF Commander General Ryan thought the

bombing "should be carefully designed to create the greatest possible psychological impact

on the government and people of NVN. Attacks must be coordinated to achieve

destruction of the target system in the shortest possible time, thus bringing home to Hanoi

the full impact of our strength and determination."[27]

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p. 46.
[26] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, pp. 397 and 401.
[27] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 132.

The Johnson Administration's graduated bombing strategy and its accompanying

restrictions frustrated military leaders. Infiltration had begun modestly, but increased as

bombing progressed. Both NVA and VC forces had increased by 1968. As Hanoi

resisted the bombing, senior commanders became convinced "diminished effectiveness has

not been due to airpower but due to the restrictions placed on airpower."[28] They believed

the President's policy diluted air power's effectiveness because bombing was spread out

over too much time and against too few targets. Army Chief of Staff General Harold

Johnson thought graduated bombing, "permits the enemy to accommodate, and that it is

not the most effective use of power."[29] General Gilbert Meyers, former Vice Commander

of 2nd Air Division (and then Seventh Air Force) in Vietnam, asserted, "This graduated

application of airpower I think has a major impact on the effectiveness of the airstrikes in

the north" since "when you attack them [targets] over a period of time ... you lose the

impact that accrues when a series of targets are destroyed at one time" because the enemy

has time to adapt and make repairs.[30] Chief of Naval Operations Admiral Thomas Moorer

said graduated bombing "enabled the North Vietnamese to build up air defenses and to

develop a reconstruction capability ... to offset the bombing."[31] Commandant of the

Marine Corps General Wallace Greene was more emphatic, saying, "certainly the air

campaign in the north has been crippled by the restrictions that have been placed upon

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[28] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 504.
[29] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 407.
[30] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, pp. 475 and 481.
[31] Senate Preparedness Subcommittee, Part 3, Aug. 23, 1967, p. 269.

it."[32] General Johnson summed up JCS disagreements with the President's strategy by

saying, "I think the major point of contention has been the rate at which pressures have

been increased, and I think that the military commanders have chafed continually under a

relatively slow rate of increase of the pressure."[33]

Another military complaint was that the administration's ever-changing restrictions

obscured the bombing's purpose. Colonel Henry Edelen of the Air Staff observed, "An air

campaign against North Vietnam might be considered as a goal itself or as having goals."[34]

The administration acted as if the bombing itself were a goal, but the military leadership

perceived bombing as a means of achieving objectives. If Rolling Thunder's mere

existence were the goal, then operational details– such as arbitrary restrictions imposed on

bombing – were relatively unimportant. The campaign's success could then be judged

directly by political criteria largely divorced from military considerations. Conversely, if

the campaign were designed primarily to achieve specific military objectives then any

political restrictions would need to be carefully balanced against the risk those restrictions

would prevent achieving the underlying military objectives.

Uncertainty about how political restrictions might change in the future also

undermined air strategy formulation. Major General Ginsburgh, JCS liaison to the White

House, remarked, "You never knew when you started on the campaign the extent to

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[32] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 454.
[33] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 411.
[34] Col. Henry H. Edelen, Jr., OHI transcript, Jan. 27, 1970, K239.0512-243, in USAF Collection, AFHRA, p. 65.

which you would be allowed to finish it."[35] As Edelen explained, "If you don't know

what your constraints or limitations are going to be at the end of a 12-month period, it's

difficult to establish what your goals are going to be for that same period."[36] Divergent

conceptions of the campaign as either a direct political end unto itself or a means of

attaining military results that would indirectly lead to desired political ends divided civilian

and military leaders.

The Johnson Administration rejected military views about conducting the

campaign at least partly for political reasons since most officials,

> apparently accepted the military view that a limited, gradual program
> would exert less pressure upon NVN than a program of heavy bombing
> from the outset, and they apparently granted that less pressure was less
> likely to get NVN to scale down or call off the insurgency, or enter into
> reasonable negotiations. They felt, however, that all-out bombing would
> pose far greater risks of widening the war, would transmit a signal strength
> out of all proportion to the limited objectives and intentions of the U.S. in
> Southeast Asia, would carry unacceptable political penalties, and would
> perhaps foreclose the promise of achieving U.S. goals at a relatively low
> level of violence.[37]

Commanders usually kept their complaints and misgivings to themselves, but they

sometimes communicated outside routine channels. Growing frustration with the

administration's strategy and a possible wish to bypass the normal chain of command

eventually led them to encourage Senate hearings about Rolling Thunder. The Committee

on Armed Services, Preparedness Investigating Subcommittee (commonly called the

Stennis Committee after Senator John Stennis who served as chairman) interviewed the

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[35] Maj. Gen. Robert N. Ginsburgh, OHI transcript, May 26, 1971, May 26, 1971, K239.0512-477, in
USAF Collection, AFHRA, p. 41.
[36] Edelen, OHI transcript, p. 65.

Secretary of Defense, each service chief, and some other top commanders between August

9 and 25, 1967. Senator Stennis and other committee members such as Senator

Symington, a former Secretary of the Air Force, openly sympathized with the military

leaders. The Stennis Committee hearings temporarily pressured the administration to

conduct Rolling Thunder more in accordance with military wishes, but served more to

highlight than to bridge the gap between military and administration bombing strategies.

Speaking of single, separate, and distinct civilian or military air strategies is an

oversimplification, but not a serious one. Different civilian officials had different ideas and

their strategy ideas evolved over time. Those who favored strong military measures were

called hawks while their less forceful associates were called doves. The doves gradually

gained ascendancy as the years passed. Secretary of Defense McNamara was a

particularly influential official who progressively lost confidence in bombing's efficacy.

Military officials changed their air strategy precepts only slightly over time, but different

organizations may have held different views. According to Col. Edelen of the Air Staff,

CINCPAC preferred the widest possible target base in order to gain more surprise,

initiative, and lower aircraft loss rates. However, the JCS favored concentrating on

specific enemy systems such as POL or electricity. Edelen perceived not a divergence

between CINCPAC and JCS air strategies, but merely different styles of coping with the

administration's political restrictions.[38] The opposing air strategies did not exist in

isolation, but interacted in complex ways as advocates of each view tried to win converts.

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[37] Pentagon Papers, IV.C.7.(a), vol. I, p. 1.
[38] Edelen, OHI transcript, pp. 97-99.

The rift between those who urged heavier bombing and those who urged restraint remained a perennial obstacle to achieving consensus and developing a suitable bombing strategy. Simmering strategy disputes remained unresolved for years. Just as civil-military disagreement about objectives contributed to disagreements about strategy, strategy disputes contributed to divergent views about how to measure effectiveness. Writing many years afterwards about the disagreements existing before the bombing campaign had even started, Secretary McNamara recalled, "This question of bombing's effectiveness ... became a fundamental issue between the president and me, on the one hand, and the chiefs [of staff] and military commanders in Vietnam on the other, for the next three and a half years."[39] Civilian and military organizations kept trying to determine whether bombing was having the desired effects, but fundamental disagreements emerged over how to determine effectiveness. Feedback from the war zone would seem an obvious way to settle the issue, but measuring the bombing's results was a contentious process that was influenced by preconceived views. The prolonged campaign allowed time for effectiveness judgments to evolve, but not necessarily improve. Attempts to measure results were as likely to reinforce preexisting air strategy biases as to reveal the best way to prosecute the war.

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[39] McNamara, p. 153.

CHAPTER 3 – FLYING UNIT BOMBING ASSESSMENT

Top officials formulated national goals and strategies, but relied on subordinates to collect and analyze information about bombing results. The USAF played a relatively small part in developing Rolling Thunder's objectives and strategy, but had a large assessment role. This chapter will explain how Air Force squadrons and wings evaluated their Rolling Thunder bombing. Numerous units were involved, but their bombing assessment activities were functionally similar and evolved slowly over time, making a topically organized discussion more appropriate than a chronologically organized narrative. Topics emphasized will include the types of data sought; procedures used to gather, process, and report data; and opinions expressed about how well headquarters conducted and assessed the campaign. Navy flying units will also receive brief attention.

Flying units did more than report raw data to headquarters. They applied sophisticated assessment techniques, but the methods used generated internal tensions within the units themselves and external tensions between flying units and headquarters. Internal tensions between aircrews and intelligence (intel) officers were rarely severe enough to interfere significantly with assessment activities. External stresses arose partly from an imbalance between the extensive information units reported and the limited feedback they received. Units seldom received all the information – especially photography – they wanted from higher headquarters, yet headquarters levied ever more

stringent reporting requirements. External stresses degraded the assessment process to a

moderate extent. As headquarters squeezed flying units harder for more information,

some of the data slipped between their fingers like sand as the units became less

cooperative.

Aircrew Data Collection and Assessment

With only a few exceptions, Air Force units involved in Rolling Thunder were

under the operational control of Second Air Division, until that headquarters was

redesignated Seventh Air Force (AF) in 1966, located in South Vietnam and reported their

bombing related data to that organization. Data gathered and reported by aircrews was a

starting point for Seventh AF and subsequent headquarters analyses of how bombing

affected North Vietnam. Several types of information predominated. The strike crews'

visual observations were the first, quickest, and most obvious information source. One

experienced pilot explained that initial damage assessment "was strictly up to the crew in

most cases."[1] Crews provided verbal descriptions of mission results during a post flight

debriefing during which intel officers asked for details they needed to report to

headquarters. A second information source became available when strike aircraft

produced photographic evidence of their own mission results. Strike cameras mounted on

bombing planes automatically began taking pictures after bomb release and the images

might show where the bombs had hit. Those cameras were often unavailable or unused at

first, but saw increasing use as the campaign unfolded. If the planes were equipped with strike cameras, photos might be available within minutes after landing. Post strike reconnaissance sorties were a third common aircrew information source. Specialized reconnaissance squadrons performed most post strike photography. Recce planes photographed targets anywhere from minutes to weeks after attacks, but photos often went directly to Seventh AF headquarters so a long time might elapse before the pictures trickled down to the squadron that had performed the bombing. In parts of southern North Vietnam without significant antiaircraft defenses, forward air controllers (FACs) flying slow propeller-driven spotting planes guided some armed reconnaissance missions to trucks and other fleeting targets the FACs had spotted visually. The so-called "Misty FACs" flew the faster F-100 jet aircraft over more heavily defended areas of southern North Vietnam, but air strikes farther north flew without FACs. Forward Air Controllers provided immediate feedback over the radio to strike crews and also filed their own post flight reports to supplement strike aircrew observations. Higher command echelons amalgamated numerous reports from strike and reconnaissance missions along with data from other sources to form overall judgments about the bombing's accomplishments. Since aircrew reports were a basic input into the assessment process, the nature of the raw data they supplied helped set the tone of subsequent analyses.

A flying unit's daily orders were an important initial reference point for judging bombing effectiveness because the orders specified the missions for which the unit was

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[1] Maj. Robert E. Buhrow, OHI transcript, Apr. 11, 1968, K239.0512-047, in USAF Collection, AFHRA,

tasked. Second Air Division or Seventh AF controlled day-to-day Air Force strike and

reconnaissance activities through a voluminous daily operational order. Any single flying

unit would receive and be responsible for only a small fragment of that order; hence

squadrons and wings would be "fragged" for specific missions. The frag each unit

received included instructions for takeoff times, air refueling, target identity, time over

target, and numerous other details. Aircrews prepared for their missions by planning

exactly how to carry out their fragged missions. Photographs and other information about

fixed targets or armed reconnaissance routes were usually important preparation items.

Intel reports about enemy air defense dispositions influenced strike mission commanders'

decisions about routing and altitudes to and from targets – unless a higher authority

specified those parameters. Aircrews considered missions flown "as fragged" to have

been basically successful if assigned targets were hit and few if any aircraft were lost.

When Rolling Thunder started, the Air Force and Navy used different message

formats to transmit bombing results, but the Air Force soon adopted the Navy's OPREP

(operational report) format. The standardized OPREP-4 message soon emerged as a basic

building block of Air Force and Navy bombing assessment. Squadron intelligence officers

gathered the data needed to complete OPREP-4s during post flight debriefings, and then

submitted the reports to headquarters via a secure electronic network. In addition to

listing details such as mission number, target location, numbers and types of aircraft,

ordnance expended, and weather encountered, the messages told about aircraft damaged

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p. 24.

or lost, and included remarks about bombing results. Some missions did not report any

results, often because smoke, clouds, or darkness obscured the pilots' view. Aircrews

may have had other reasons (to be explained later) not to give fully detailed reports.

Operational reports rarely mentioned any enemy personnel who might have been killed or

wounded by air strikes.

Aircrews did not confine their judgments about mission effectiveness to official

post flight reports. They also expressed many subtle and perceptive ideas in memoirs or

during USAF Oral History Interviews conducted during the war. Aircrews' bombing

effectiveness standards were simple in some ways, yet complex in others. As in other

wars, a crew's basic concern was to hit targets and survive missions. Immediate first

order results observed during the mission or during review of strike photos after landing

were their main information source. Colonel Jack Broughton, an F-105 wing vice

commander, remarked, "Combat pilots are not usually big on statistics."[2] However,

crewmembers developed sophisticated informal ways of judging results and often became

discriminating observers who expressed definite ideas about how to recognize and conduct

effective bombing. For example, Col. Broughton used enemy propaganda and official

statements as an effectiveness indicator when he asserted, "We knew we were doing good

work, not only from our own assessment of the raids but from the fact that Hanoi

screamed like a bunch of wounded eagles every time we got a good lick in."[3] Some pilots

[2] Col. Jack Broughton, Going Downtown: The War Against Hanoi and Washington, (New York: Orion Books, 1988), p. 192.
[3] Col. Jack Broughton, Thud Ridge. (Philadelphia and New York: J. B. Lippincott Co.), 1969, p. 87.

found reasons to judge bombing worthwhile, but many complained about factors they

believed were degrading their results.

Virtually all pilots deemed aerial photography a key to success. Although

headquarters officials had access to "strategic" reconnaissance imagery from high-flying

SR-71 and U-2 aircraft, pictures taken by low altitude reconnaissance flights were the

staple photography source for flying units. Tactical recce pilots flew day and night - one

pilot reported that half of his unit's missions were at night. Others put the night sortie

percentage closer to one third of their unit's total reconnaissance effort. A daytime photo

depicted targets much as aircrews saw them with their own eyes. Night photography was

harder for pilots to interpret, and taking the pictures was extra hazardous when recce

crews used photo flash cartridges to illuminate targets because the incredibly bright flashes

disclosed the plane's location to enemy defenders.[4] Infrared photos were safer to take,

but did not reveal the desired information about some target types. However pictures

were obtained, strike crews relied on them both to reveal previous bomb damage and to

help plan future strikes. Pilots deemed both functions necessary for effective bombing, but

timely dissemination of current target photos was a persistent problem. As far as pilots

were concerned, recent photos were almost always better than old ones.

Pilots applied different timeliness standards for fixed target photos than armed

reconnaissance photos. Headquarters intelligence staffs processed countless

reconnaissance images, but pilots complained about excessive delays in obtaining them for

mission preparation against fixed targets. Major Robert Buhrow, a 555th Tactical Fighter

Squadron (TFS) pilot and veteran of 100 missions over the North in the F-4, considered

his preflight intelligence briefings excellent except for the prevalence of outdated target

imagery. He noted most pictures were "anywhere from a month to eighteen months old,"

but the reason for the delay puzzled him. He knew reconnaissance planes were often

scheduled to photograph targets within hours after a strike and that the pictures were

developed right after those planes landed. Courier planes flew the prints to Seventh AF

headquarters, but "it would take us a month to see them in some cases." Meanwhile,

crews might reuse the old photographs to plan another strike against that same target a

few days later. Buhrow noted that when photos were outdated, the target's appearance

might have changed so much that the photos were almost useless, meaning, "From an

operational standpoint, it was just ridiculous to try to work with photo intelligence that

old."[5] Colonel Robin Olds, who was Buhrow's wing commander, also characterized target

planning materials as "lousy" due to old target photos – particularly when the 8th Tactical

Fighter Wing (TFW) first deployed to Thailand.[6]

Interestingly, Maj. Buhrow expressed different sentiments about photo availability

when interviewed again about six months later. When asked how soon after a mission

crews received definite results, he said they sometimes never received them. However, on

priority targets such as power plants, he said post strike photos might arrive in a couple

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[4] Maj. Olive J. Hines, OHI transcript, Jan. 21, 1969, K239.0512-104, in USAF Collection, AFHRA, pp. 7-8.

[5] Buhrow, OHI transcript, Sep. 28, 1967, K239.0512-028, in USAF Collection, AFHRA, pp. 26-28.

days. Updated images of especially important targets like the Thai Nguyen steel mill were often available the next morning if another mission were scheduled that day.[7] The reason for Buhrow's revised opinion is not clear, but crews evidently felt headquarters rationed BDA information based on the units' presumed need to know. Prompt dissemination of photos was possible, but only if Seventh AF chose to make the extra effort. Units had minimal influence on those headquarters decisions and were irritated by the delays.

Photos taken the previous day may have seemed more than timely enough for fixed target strikes, but pilots wanted images of ephemeral armed reconnaissance targets such as truck parking areas (usually shortened to "truck park") to be disseminated even faster. Pilots knew such targets needed to be located and bombed within hours or the imagery would be nearly useless. Major Arvid Skogerboe complained about "the seemingly excessive amount of time involved in processing photo information and getting it into the frag shop where it could be picked out as a target and fragged and get a strike on it." Nighttime photography was potentially valuable because Buhrow reckoned infrared-equipped reconnaissance aircraft could land within an hour after taking pictures and their film could be developed and given a "non-expert evaluation" within an hour after landing. Any targets found could be called in to the command post, which could divert sorties already airborne to strike them. Skogerboe said the reconnaissance squadrons wanted to

[6] Brig. Gen. Robin Olds, OHI transcript, 1968 (month and day unknown), K239.0512-051, in USAF Collection, AFHRA, p. 37.
[7] Buhrow, OHI transcript, Apr. 11, 1968, pp. 26-27.

try the idea, but "this didn't get off the ground."[8] He reckoned actual film analysis took about 9 hours, by which time a mobile target like a truck park might easily have moved.

Although Rolling Thunder's official purpose was to reduce infiltration into the South, combat pilots did not necessarily deem absence of enemy movement a sign of success. The pilots flew missions to destroy things and measured success not by enemy activity prevented, but by visible damage inflicted. Everyone in the units knew most enemy traffic moved by night, but armed reconnaissance missions flew both day and night. One pilot expressed a typical sentiment during an interview when he said, "the night effort was by far the most productive because you would go over day after day ... and not see anything that would move. ... You'd go hit a truck park, and if you were lucky, you might get one that was occupied, but it was strictly on luck."[9] Another complained that railroad interdiction sometimes meant "trying to complete a meaningless strike against empty tracks."[10] Pilots did not find persuasive the idea that the absence of enemy traffic meant the armed reconnaissance flights were successfully denying the enemy the ability to travel at will. Expending ordnance on dubious backup targets after finding nothing better to bomb during armed reconnaissance sorties seemed disappointing and unsatisfying.

By the same token, pilots measured the success of bombing intended to suppress enemy air defenses primarily by physical destruction inflicted on surface to air missile (SAM) and antiaircraft artillery (AAA) sites. When describing successful SAM

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[8] Maj. Arvid N. Skogerboe, OHI transcript, Apr. 11, 1968, K239.0512-048, in USAF Collection, AFHRA p. 11.
[9] Buhrow, OHI transcript, Sep. 28, 1967, p. 29.
[10] Broughton, Going Downtown, p. 139.

suppression missions, Col. Broughton listed examples when crews "either had film of their bombs going off on a recognizable site, or they had secondaries [explosions] of bright orange smoke coming out of the site."[11] However, pilots also routinely evaluated defense suppression in more functional terms by noting whether ground sites stopped firing at them after being bombed.

The pilots' strong desire to put bombs on target meant they disliked jettisoning ordnance when under attack. "Dumping" ordnance prior to the bomb run was probably deemed a worse failure than missing the target. Planes heavily laden with bombs were slower and less maneuverable than when in a "clean" configuration, but a sense of pride and a determination not to waste their sorties kept pilots from jettisoning except under desperate conditions. As Broughton explained, "Regardless of what else happened, you won if you bombed successfully in spite of the Migs and you lost if the Migs, or anything else, forced you to get rid of the bombs anyplace other than on target. It took guts and a lot of discipline to keep thundering along with fast, maneuverable adversaries nipping at your tail."[12] Pilots had to report what they had done with their ordnance, and nobody wanted to have to say he had jettisoned it without good reason.

Squadron and Wing Assessment Methods

Aircrews belonged to squadrons, which, in turn, were assigned to wings. Squadrons and wings were more than agglomerations of aircrews, intelligence officers,

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[11] Broughton, Going Downtown, p. 183.
[12] Broughton, Going Downtown, p. 153.

and staff members – they were complex organizations possessing distinct cultures and identities that influenced their attitudes towards bombing effectiveness measurement. Flying units used OPREP-4 data and any other information they could obtain to evaluate their own performance. They took pride in their achievements and were determined to show their sacrifices of airplanes and crews were not in vain, but sometimes made frank admissions about their assessment methods' shortcomings.

Combat units devised systematic techniques for extracting mission results from pilots and reporting the information to headquarters. Headquarters gave the units wide latitude in choosing specific techniques so procedures varied widely. Crews typically began the debriefing process by reporting their planes' mechanical status to maintenance technicians. Maintenance debriefing usually lasted only a few minutes. The intelligence debriefing was next. Intel usually began by debriefing each crew individually followed by a "gaggle" debriefing of all the units' crews that had flown the mission, but might reverse that sequence. Intel personnel either wrote required information directly on some sort of locally developed OPREP-4 worksheet or else tape-recorded the debriefing if there was too much to write. Major Frederick Vosper said intel officers were interested in cross checking information gathered during individual and group debriefings and "trying to again pin down just where or what the target damage was or where the crew felt that their bombs hit."[13] One intel officer estimated the average debriefings took about twenty minutes. Strike photos – if any were available - would be developed by about the time

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[13] Maj. Frederick J. Vosper, OHI tape, n.d. (circa 1970), K239.0512-330, in USAF Collection, AFHRA. (The transcript will not be cited because it only paraphrases Vosper's words.)

crews were finishing their intel debriefings. Headquarters was very explicit about when

and how units were to submit their strike mission reports. The OPREP-4s had to be sent

within about an hour after landing so the intel staff hurried to arrange the required data

from worksheets, tape recordings, and any available strike photos into the standardized

message format and transmit the report as soon as practical.[14]

Flying units sometimes expressed doubts about the routine bombing data they were

required to collect and report. Reports like the OPREP-4s became increasingly

burdensome and some units began to question the validity of the data they contained.

Much of the new reporting was in addition to the OPREP-4s. Eighth TFW intelligence

chief Lt. Col. Clark Allison said, "When we first arrived over there, we were using the

OPREP-4s in the briefing process and it was fairly simple. As the war became more

complex, and as more people became more interested in the war there was quite a

generation of various forms and lengthening of the OPREP-4."[15] Major Vosper of the

388th TFW noted that required forms and reports proliferated as new types of equipment

such as guided bombs and Wild Weasel SAM suppression planes entered service.

Headquarters wanted to know how the new equipment was performing.

Punched card computer processing became the mandated way to manage the rising

tide of data, but the method entailed growing pains in the flying units. The new automated

system was designed to produce what were called Combat Activities Reports, but unit

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[14] For descriptions of debriefing methods used in different wings, see Vosper tape and Lt. Lawrence M. Taylor OHI tape, n.d. (circa 1970), K239.0512-329, in USAF Collection, AFHRA.

[15] Lt. Col. Clark H. Allison, OHI tape, n.d. (circa 1970), K239.0512-298, in USAF Collection, AFHRA. (The transcript will not be cited because it only paraphrases Allison's words.)

intelligence personnel used the acronym "COACT" when referring to the whole system. Major Vosper said his wing originally filled in the appropriate blocks on OPREP-4s and other reports and sent them to Seventh AF where somebody else punched the computer cards. His unit later acquired card punching gear and intel staff members learned how to produce their own cards. Lieutenant Colonel Allison recalled that when COACT data entry was introduced in his wing, "it took three or four months with a specialist coming from PACAF telling us exactly how to fill it out" because entries had to be completed in a specific way or the computer would reject them. The precise format combined with the short time deadlines made Allison feel "we were almost in a zero defects, cost effectiveness, error free performance to see whose unit could get there with the least errors" because "occasionally Seventh AF would run a study to see who was running late on the OPREP-4s."[16] Reporting became a laborious chore.

Constant procedural changes and increasing form complexity may have distorted bombing data contained in the OPREP-4 and other routine reports. Lieutenant Colonel Allison gave an example of how acceptable terminology kept changing. At first, reports had to say a mission had "cratered" a road in some number of places. The proper wording later changed so that units were required to say they had "cut" roads instead of cratering them. Allison said other terms also kept changing and that keeping up with the current approved jargon was annoying.[17]

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[16] Allison, OHI tape.
[17] Allison, OHI tape.

Allison perceived deeper problems with the reporting methods than mere jargon changes. He thought the more complex debriefing forms lengthened aircrew post flight debriefings without necessarily yielding better information. For example, the COACT form requested bomb release airspeed and dive angle, but the computer would accept only certain numbers "so the aircrews would just give us the standard pat answers" even if the true numbers were different. If crews encountered flak, they had to fill out an additional lengthy form "so it was much simpler for the crews to say 'no flak reported' and of course then this detracted from the Seventh AF report of flak observed." Allison felt "all this tended to degenerate [sic] from what we were really trying to extract from the crews and I think we lost some possibly good sources of information because it either tended to incriminate the aircrew or it was too much bother to really get the full details." A pilot might have feared he was incriminating himself if he admitted to deviating from prescribed dive angle, bomb release airspeed, or some other parameter reported on the forms. Allison also remarked that strict report submission time constraints meant, "in many cases, probably some corners were cut to get the thing on the wire ... and I think sometimes the point of the OPREP-4 was overlooked."[18] He was certain there was some "happy medium" procedure that would obtain necessary information without subjecting flying unit personnel to the existing method's adverse side effects.

The flying units' enthusiasm for data collection varied over time. When they first deployed to Southeast Asia or when they were flying what they deemed important or

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[18] Allison, OHI tape. Allison probably meant to say "detract" rather than "degenerate."

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exciting missions, units were eager to report their achievements. When those conditions

no longer prevailed, enthusiasm faded. The April 1968 bombing halt above 19° North

may have been one change that dampened units' interest in gathering OPREP-4 and other

bombing data. Captain Howard Ankerman, 8th TFW intelligence officer during 1968, said

that "Pilots flew out and they dropped their ordnance and had no visual results, no BDA,

no [air defense] reactions, and they would come home. I would say that well over 60% of

our OPREP-4s went out just like that with nothing else on them and became rather, as I

said, redundant. These reports didn't help anybody at all and they just said we flew the

mission we were fragged for."[19] His remark implied the OPREP-4s had been more

meaningful when missions had previously struck areas farther north and provoked strong

antiaircraft defensive responses. Although planes were confined to roughly the same

southern panhandle areas in 1968 as they had been in early to mid 1965, the dull routine

and dimmed prospects of expanding the campaign to the Hanoi-Haiphong area may have

sapped flying units' enthusiasm to report results in the latter period.

Commanders and operations officers were extremely interested in the bombing

performance of their crews and often kept informed by reviewing any OPREP-4s that

described unusual events before their intelligence staff transmitted the reports to

headquarters. As will be explained later, some commanders exerted even tighter

supervision over reports, but flying units used methods other than official reports to

monitor their bombing performance.

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[19] Capt. Howard Ankerman, Jr., OHI transcript, n.d. (circa 1970), K239.0512-299, in USAF Collection, AFHRA, p. 7.

Fighter wing commanders relied on their intelligence officers to keep them informed through daily briefings. Each morning, Lt. Col. Allison or some other 8th TFW intelligence officer gave the wing commander a verbal overview of missions, targets, battle damage to aircraft, flak, messages or analyses received from headquarters, or anything else "that would possibly assist him in making any decisions or keep him appraised day-to-day on what the other wings were doing."[20] Those daily briefings usually lasted about an hour. Other wings followed similar routines, but briefing times and formats varied from unit to unit and from one commander to the next. Major Vosper said the daily briefings he gave the 388th TFW commander at 5 PM included a "daily BDA wrap-up" and "a weekly BDA wrap-up." The 388th expanded the verbal briefings into multimedia presentations. By using all available strike camera film and modifying gun cameras to turn on during bomb runs instead of just when the aircraft's gun was fired, Vosper's intel shop assembled a "comprehensive 16 millimeter briefing of the day's strikes" to be shown during the wing commander's daily intel briefing. Vosper noted his commander also wanted to know what other wings were doing, such as "results of the other out-country wings, not so much what they had done – although this was briefed – but defenses they had run into."[21] The commander was evidently more interested in air defense status than in comparing his wing's bombing performance with that of other wings.

Reconnaissance wing commanders also received regular briefings, but monitored different metrics than their tactical fighter wing counterparts. Lieutenant Lawrence Taylor

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[20] Allison, OHI tape.
[21] Vosper, OHI tape.

said the 432nd Tactical Reconnaissance Wing (TRW) commander wanted to know how

many reconnaissance missions had been flown and how many targets had been

photographed. Briefings also covered any assigned targets that had not been

photographed and the reasons for those "rejected" targets. Taylor was skeptical about

some of the information his commander received. Camera reliability percentages were one

important parameter recce commanders tracked. Lieutenant Taylor noted the official

reliability rate was usually 95% or better, but he was convinced the figures were

"extremely distorted ... we saw a hell of a lot more camera failures than that during any

given mission." Since recon wings looked for new targets and photographed targets other

wings had bombed (or might bomb later), they judged their success by how well they took

pictures. Taylor said that showing the "best" or "most interesting" recce pictures taken

since the last briefing was another part of the 423nd's daily briefings, but he thought that

when crews missed photographing targets "people would try to cover up or modify the

information" so "it seemed to me that a lot of the information that finally got to be

presented at the wing commander's level got distorted one way or the other."[22]

Squadron members liked knowing what their bombing had accomplished, but such

specific information was hard to obtain. Missions against important Route Package 6

targets often included aircraft from several squadrons, but post strike reconnaissance was

seldom able to distinguish between damage inflicted by different squadrons. Captain

Ankerman, an intelligence officer in the 8th TFW, noted that photos of a bridge might

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[22] Taylor, OHI tape. (The transcript will not be cited because it only paraphrases Taylor's words.)

show the bridge had been dropped, "but you didn't know exactly whether your bombs had dropped it or if it was the whole flight's bombs or the whole mission's bombs."[23] Units judged the simple fact that the damage was inflicted a bit less satisfying than the knowledge that their own planes had scored the decisive hits.

If a flying unit were remiss in transmitting required reports to headquarters, the unit commander soon heard about it, but the units seldom received all the BDA feedback they desired from headquarters. Many wings responded by trying to become as self-sufficient as possible in generating their own BDA data. Both practical and emotional motives spurred their efforts. Major Vosper was highly enthusiastic about how successfully the 388th TFW had adapted gun camera and strike camera film to provide locally produced operational intelligence data such as the materials briefed daily to the wing commander. The 8th TFW's Captain Ankerman said his wing collected any available films of MiG kills or "particularly significant strikes" and used them as "morale builders" at social functions. After bombing was confined to the southern panhandle in April 1968, he said that "significant" strikes became rare. Headquarters still sent some pictures of road interdiction points, but Ankerman felt "It was just like great big sand piles so you would get your BDA from this" but there was no way to tell what damage a given mission had inflicted.[24] Squadrons liked knowing as much as possible about individual sortie results, so FACs then became a leading source of sortie-specific feedback.

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[23] Ankerman, OHI transcript, p. 12.
[24] Ankerman, OHI transcript, pp. 5 and 12.

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Specialized aerial reconnaissance units such as the 100th Strategic Reconnaissance Wing's (SRW) U-2 detachment occupied a hybrid organizational status that interposed them between the combat units' desire for feedback and the higher headquarters' tendency to control the flow of bombing assessment data. The U-2 detachment flew what were called Giant Dragon sorties from a base in South Vietnam, but operated under the control of Strategic Air Command rather than Seventh AF, which controlled nearly all other USAF units in the theater. Colonel George Nakis, detachment commander from June to October 1966, said Giant Dragon sorties flew mostly over Laos and South Vietnam rather than North Vietnam and carefully avoided surface-to-air missile (SAM) sites. When they did fly, the high-flying planes differed from ordinary post strike recce missions in that they were not integrated with strike missions and were "independent of having to coordinate our requirements with peak fighter activity."[25]

Nakis held mixed feelings about the command arrangements governing his unit. He saw some advantages to "7th Air Force having direct contact with the [U-2] unit as far as giving support to say 7th Air Force for a reconnaissance requirement and by-passing SAC in this respect," but still said SAC control was "a necessary thing" and feared that giving Seventh AF operational control risked placing the U-2 detachment under two bosses at the same time.[26] Nakis thought the arrangement gave his detachment adequate responsiveness to Seventh AF needs, but the headquarters exerted only an indirect influence over when Giant Dragon missions flew and what targets they photographed.

[25] Col. George M. Nakis, OHI transcript, Feb. 6, 1969, K239.0512-094, in USAF Collection, AFHRA, p. 7.

Colonel Nakis explained that U-2 reconnaissance was heavily dependent on photography because the planes' visual reconnaissance potential was "extremely limited" and there was no way to provide the real-time strike monitoring a FAC might provide. Under ideal conditions, U-2 imagery could be delivered to Seventh AF within hours after a flight, but delays were common. Combat wings - if they were even authorized to see the products - were unlikely to receive the data in a timely manner. Technicians promptly downloaded the "take" (data collected during flight) from returning planes. Courier aircraft then airlifted the materials to Seventh AF Headquarters. A special SAC mobile processing facility immediately processed the take and "an initial PI [photo interpretation] [was] done on the photography as soon as it was developed."[27] Copies of the results went to Seventh AF intelligence. Unfortunately, the mobile facility later redeployed to the U.S. so the take then had to be processed at an American base in Japan. From Japan, the photo prints and PI reports would find their way to Seventh AF Headquarters after an inevitable delay. Slow photo processing deprived decision-makers of timely information and also allowed some camera malfunctions to go undetected for as long as five days, during which time subsequent sorties by the same U-2 might unknowingly be taking defective imagery. Nakis was displeased with the procedure because "the time delay between our delivering take for processing and interpretation and then [getting] information back to us on its quality was entirely too long, and would not be ... a productive operation."[28] When he left South Vietnam, he was devising a way to process the take at Seventh AF

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[26] Nakis, OHI transcript, pp. 48-49.
[27] Nakis, OHI transcript, p. 17.

Headquarters. Improved processing facilities became available later, but the relatively inflexible U-2 command arrangement through SAC and the delays in delivering results to Seventh AF inhibited efforts to make Giant Dragon imagery readily available to Rolling Thunder combat units.

Tactical units were not content to evaluate their own performance by OPREP-4s, strike photos, and whatever feedback they could obtain from Seventh AF. Many produced ongoing unit histories to record their experiences – or at least those experiences they wanted to record. Unit histories varied tremendously in style and quality. Many were little more than factual chronicles or brief commemoratives celebrating their members' dedication and sacrifice. During a 1970 interview, Captain Edward Vallentiny, an Operations Analyst working for Project CHECO (an organization described in Chapter 4) dismissed unit histories as being "almost completely useless" from an operational standpoint because they "didn't really have much meat within them."[29] However, the author has found some histories that were more substantive. The 8th Tactical Fighter Wing based out of Ubon Royal Thai Air Base, Thailand was a leading USAF Rolling Thunder unit. The wing and its component squadrons wrote some thorough assessments of Rolling Thunder as seen from the flying unit perspective, but those histories tended to accentuate positive achievements. Even the best official histories are biased, but they do illustrate the standards by which combat units evaluated their bombing performance when given their own choice of standards apart from official reports.

[28] Nakis, OHI transcript, p. 19.
[29] Capt. Edward Vallentiny, OHI tape. May 8, 1970, K239.0512-270, in USAF Collection, AFHRA.

The 8th TFW deployed to Thailand in 1966 and prepared semiannual histories through the first half of 1967. Quarterly reports commenced with the July – September 1967 period. In addition, separate histories for each squadron in the wing were attached to the overall wing report. Each wing history included a detailed listing that mirrored the data reported in OPREP-4s. Histories claimed to present "the results of the ... activity of the wing and the effect on the Viet Cong's logistics and transportation complexes"[30] through statistics such as numbers of bridges, trucks and storage sites destroyed, roads cut, fires started, and U.S. aircraft lost in combat. The wing's aircraft rarely flew in South Vietnam, but the writers of the histories still deemed important the effect operations in the North had on the VC in the South.

Bombing may have been the 8th TFW's official primary role, but the air-to-air role was extremely prominent. The wing histories always stated the number of MiGs shot down and included details about each incident such as a copy of the OPREP-4, a detailed account of the aerial maneuvering involved, and any newspaper clippings describing the kills. Bombing missions received much less lavish attention. Even descriptions of raids against enemy airfields emphasized any air-to-air associated combat. One 8th TFW commander, Col. Robin Olds, was sensitive enough to the issue to point out, "Even though killing MiGs is the glamorous part of our job strike missions are of primary

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[30] 8 TFW History, Jan. – Jun. 1966, K-WG-8-HI V. 1, in USAF Collection, AFHRA, p. 11. Subsequent histories included similar wording.

importance and our reason for being here."[31] During a later interview, he reiterated, "our

primary mission was strike" not chasing MiGs.[32]

Unit histories based their bombing assessments on firsthand experience and

typically described their unit's results favorably. The 8th TFW history for October –

December 1967 claimed interdiction missions were "causing the enemy to pay heavily in

his attempt to infiltrate men and supplies into South Vietnam" and that targets were

"selected to disrupt the North Vietnamese and Viet Cong war-making capability to the

maximum extent." After citing the customary statistics about targets damaged and

destroyed, the history asserted, "These figures, however, by no means reflect the total

amount of destruction heaped upon the enemy lines of communication."[33] The implication

was that the wing's actual achievements were greater than the numbers suggested.

Unit histories reflected frustration as the bombing dragged on, but the texts

continued to emphasize the units' positive contributions. The 1968 Tet Offensive

disheartened senior government officials. Flying units were clearly disappointed by the

President's subsequent April 1, 1968 order confining bombing to the southern panhandle,

but remained guardedly optimistic about the campaign. Months after Tet, the 433rd TFS

history appraised the squadron's earlier Hanoi – Haiphong attacks by saying, "We were

fiercely proud of our contribution to the war effort, we knew that our bombs, missiles, and

cannons were taking a heavy toll where it hurt the most – at the source of the enemy's war

making potential." The report noted, "There was a feeling that maybe the United States

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[31] 8 TFW History, Jan. – Jun. 1967, p. 14.
[32] Olds, OHI transcript, p. 66.

made this highly significant concession just before we were about to achieve a decisive victory."[34] After Tet, 497th TFS optimism became mingled with some doubts about bombing's contribution to victory, and the quarterly history confessed that despite the unit's two-year bombing effort, "the enemy has shown little sign of being ready to throw in the towel."[35] The 497th's next quarterly history showed that unit's qualified optimism was not based on equating increased damage claims with increased combat effectiveness. The report said, "Although the interdiction results for April had bettered the score of each of the previous three months in terms of truck kills and damage to storage areas, the situation was not yet encouraging."[36]

Unit histories acknowledged limitations and difficulties in determining bombing results. Despite pilot complaints about outdated target photos, the 8th TFW relied on specialized reconnaissance squadrons to take most pictures and waited for the prints to reach the squadrons through normal channels. Possessing airplanes equipped for photo reconnaissance did not assure that photographs were forthcoming. The July – December 1966 8th TFW history noted that the wing had a photo reconnaissance capability, but said, "it is very unusual if it is used as such."[37] That comment may have referred to strike cameras, which were then available in Southeast Asia, but were not widely used until later. The 8th TFW history explained that any camera-equipped F-4C aircraft also carried

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[33] 8 TFW History, Oct. – Dec. 1967, p. iv.
[34] 433 TFS History, Apr. – Jun. 1968, in 8th Tactical Fighter Wing History, K-WG-8-HI V. 1, in USAF Collection, AFHRA. Page not numbered.
[35] 497 TFS History, Jan – Mar 1968, in 8th Tactical Fighter Wing History, K-WG-8-HI V. 1, in USAF Collection, AFHRA, p. 2.
[36] 497 TFS History, Apr. – Jun. 1968, chronological narrative.

ordnance and most reconnaissance was conducted visually, yet even visual observation was problematic because, "It was impossible for the pilots to make accurate battle damage assessment because of high altitude, high speed, weather, dust and debris, and darkness."[38] An 8th TFW intelligence chief estimated that 80% - 90% of the BDA went unreported during bad weather and that 40% was unreported even when visibility was good. The wing may have been concerned about justifying its claims since the histories repeatedly stated, "Integrity was the by-word for reporting battle damage; consequently, if an aircrew did not know for certain, battle damage was not reported."[39]

Unit histories were selective records and the information they left out could be as significant as that which they included. Body counts have become emblematic of Vietnam War ground combat assessment, but were not a popular Rolling Thunder metric among flying units. Enemy casualties from bombing were obviously very difficult to determine and unit histories paralleled OPREP-4s by seldom mentioning them. The 8th TFW estimated the number of enemy personnel killed, but noted, "It was impossible for the pilot to give an accurate account of the troops that their ordnance may have killed." Based on a standard planning assumption that at least one man died per truck destroyed, the intelligence chief thought the wing had killed 27 enemy troops during a particular six month period, but emphasized the number was highly tentative. He also felt certain that

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[37] 8 TFW History, Jul. – Dec. 1966, p. 13.
[38] 8 TFW History, Jan. – Jun. 1967, p. 16.
[39] 8 TFW History, Jan. – Jun. 1967, Vol. I, p. 16. Same statement is in Jul. – Dec. '67 history.

more than 27 had actually died, but deemed 27 the official tally.[40] Histories did not even

mention enemy troops wounded, but not killed.

Several aspects of the wing's body count estimate stand out. The 8th TFW felt

some need to quantify the number of enemy combatants killed, but emphasized the claim's

modesty and did not use the term "body count." Twenty-seven seems a remarkably small

toll for six months of intense bombing during which the wing lost a comparable number of

its own people in accidents and combat. The wing evidently deemed truck drivers

combatants as opposed to innocent civilians, but the histories scarcely mentioned civilian

casualties. Without explicitly denying the possibility of civilian casualties, the reports

referred only to truck drivers presumed killed during interdiction strikes without alluding

to people who might have been killed during attacks against industrial facilities located in

populated areas. With the possible additional exception of enemy pilots shot down in

aerial combat, air units downplayed casualties inflicted. Equipment and facilities

destroyed were more acceptable measures of bombing success.

Many squadron histories included statistics on sorties flown and quantities of

ordnance dropped without ascribing the numbers clear bombing effectiveness

connotations. Histories often noted the total number of combat sorties flown in a way that

suggested pride in contributing to the war. The 8th TFW valued its role as a producer of

sorties and tracked the percentage scheduled versus flown, boasting a sortie generation

"success rate" of over 99%. Sortie increases or decreases might reflect changing weather

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[40] 8 TFW History, Jul. – Dec. 66, p. 14.

conditions, but numbers of targets destroyed attracted more attention than sortie counts.

Squadrons might also itemize the ordnance they expended, but the author has not found

any cases where the units presented bomb tonnages or other weapon quantities dropped as

effectiveness indicators. Ordnance listings that did appear were often in the reports'

maintenance performance sections along with percentages of scheduled sorties flown, on

time takeoff rates, abort rates due to mechanical troubles, and similar statistics. In fact,

squadrons seemed to take pride in not expending lavish numbers of bombs. One squadron

history suggested that efficient ordnance use was a mark of effectiveness by noting,

"Strike results became more encouraging, especially since the increasing number of truck

kills and storage area fires was effected without a comparable rise in ordnance

expended."[41] To destroy more targets with less ordnance implied skill. When fighter

squadrons advertised how many bombs they had dropped to achieve a given amount of

damage, a small number was more impressive than a big number.

References to bombing accuracy are also rare in flying unit histories, and seldom

appear in memoirs or oral history interviews either. Circular error probable (CEP) is

defined as the radius of a circle around a target within which half the bombs are

statistically expected to hit. A small CEP means more accurate bombing than a large

CEP. The author has not seen any charts or graphs of circular error probable or

comparable accuracy statistics in fighter unit records. Whether squadrons routinely

reported accuracy statistics (apart from OPREP-4s) or headquarters staffs derived the data

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[41] 497 TFS History, Apr. – Jun. 1968, p. ii.

themselves is unclear. However, CEP figures did sometimes crop up among B-52 units, which bombed area targets rather than pinpoint targets. The B-52 units' interest in that parameter was reminiscent of the central role CEP played when American bomber units evaluated precision daylight bombing over Europe during World War II. Rolling Thunder tactical fighter units during appeared to judge accuracy by the simple standard of whether or not the bombs hit the target. A miss was a miss and units rarely mentioned distances. Fighter pilots seemed to pride themselves on accurate or "surgical" bomb delivery, but revealed less interest in quantifying their accuracy. Interestingly, despite the strong competitive spirit typical of fighter units, the author has not seen any cases where different units compared their bombing accuracies.

The emphasis on "surgical" bombing accuracy without defining the term may have been linked to units' reticence about civilian casualties. Bombs that missed a remote bridge usually caused no harm, but accuracy was much more vital when attacking targets in populated areas. Achieving precise bomb delivery against small heavily defended urban targets was challenging at a time when precision-guided munitions were novelties. Cluster bombs dropped to suppress air defense sites covered wide areas with hundreds of lethal bomblets. Accuracy was extremely dependent upon pilot skill, aircraft type, weather, target characteristics, and air defenses. According to Undersecretary of the Air Force Townsend Hoopes, accuracies of a few hundred feet were typical under favorable conditions, but miss distances might increase to as much as 1,800 feet under unfavorable

conditions.[42] Some critics have speculated aircrews avoided explicit accuracy quantification because "they would 'go crazy' if they thought about what was happening on the ground as a result of their bombs."[43] That explanation sounds simplistic and impugns the aircrews' professionalism, but the fact remains that flying units seldom cited statistics about either civilian casualties or bombing accuracy.

Units did not always explain why their histories excluded topics, but some units were careful to point out why their histories included specific data. Practical rather than sentimental considerations shaped some choices. The 497th TFS history for July 1967 described itself as the first time the squadron had kept accurate statistical records. The unit expressed definite motives for collecting data, explaining, "The total number of barges and trucks sighted and the percentage destroyed provide a meaningful numerical measure of our effectiveness. If our results change radically, it may be possible to pinpoint why. Without these figures it would be impossible to know for certain that our effectiveness was changing in the first place." The squadron also intended to "support desired ordnance changes with these figures" because combat experience showed guns and rockets were better able than bombs to destroy the small vehicles comprising most armed reconnaissance and interdiction targets.[44] The unit hoped to justify larger supplies of the weapons their locally produced statistics demonstrated were most effective.

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[42] Townsend Hoopes, The Limits of Intervention: An Inside Account of How the Johnson Policy of Escalation in Vietnam was Reversed. (New York: David McKay Company, Inc., 1969), p. 77.
[43] Raphael Littauer and Norman Uphoff, eds., The Air War in Indochina, (Boston: Beacon, 1972), p. 28.
[44] 497 TFS History, Jul. 1967, p. 3

Collecting data to either support conclusions the unit had already reached or

provide a basis for future decisions helped explain the squadron's choices of which

bombing parameters to record. The 497th TFS history for July 1967 acknowledged the

first month's statistics such as the fact that 14% of nighttime truck sightings resulted in a

kill had "no meaning at this point" because there was no past experience for comparison.

The report was openly skeptical about the correctness of truck sighting statistics, but still

insisted the trend data were valuable because,

> Pilots often exaggerate the number of headlights seen, and at 500 KCAS
> [knots calibrated airspeed] it is difficult to be accurate. What is hoped is
> simply that the figures provide a good estimate of the relative effectiveness
> of the squadron. Despite the obvious errors which must occur in pilot
> reports and estimations the figures must be better than simply declaring we
> had a good month, or a bad month, or a mediocre month. Incredibly
> enough, this is just what we have been basing our changes in tactics and
> ordnance configurations upon in the past.[45]

The 497th even developed its own "mission log" to gather desired statistics. By

early 1968, 497th TFS crews were filling out a preprinted form that included information

similar to that reported on OPREP-4 messages. In addition to the usual details like date,

call sign, and target location, the locally produced form had a space for "unusual

occurrances [sic]." The spelling error dramatized the form's homemade character. A

revised version that appeared in late April 1968 added spaces for BDA, number of

secondary explosions, and number of AAA sites silenced.[46] Other units may have

followed suit. Lieutenant Lawrence Taylor described how the 432nd TRW created its own

[45] 497 TFS History, Jul. 1967, p. 3a.
[46] 497 TFS History, Apr. – Jun. 1968.

worksheets for recording mission results and organizing the information for entry into

OPREP-4 format.[47]

Squadron motivations for measuring bombing success were therefore more

complex than meeting headquarters' OPREP-4 requirements or showcasing the unit's

prowess. Tactical units understood measurement was both difficult and error-prone, but

felt a need to develop some tangible basis for evaluating past actions and deciding how to

improve future results. Their effectiveness measurements were dynamic parameters

linking past, present, and future unit activities.

As the organizations actually performing the bombing, squadrons recognized that

quantifiable data did not adequately express the variables surrounding bombing operations.

They knew that human factors exerted a powerful influence on performance and found the

100-mission tour length policy particularly troublesome. Most military personnel served a

one year tour in Southeast Asia, but until 1968, crewmembers were eligible to transfer out

of the war zone as soon as they had completed 100 "counters" (combat missions over the

North). When squadrons deployed together, the original aircrews finished their 100

missions at about the same time, (sometimes within months) setting the stage for a mass

exodus of experienced flyers and a mass influx of replacements. During Rolling Thunder's

final year, the policy changed so that flyers stayed for a year like everyone else.

Wholesale rotations disrupted flying units' sense of continuity, blocking attempts

to perceive changes in the bombing campaign over long periods. Overwhelmed by daily

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[47] L. Taylor, OHI tape. The 432 TRW form was used for debriefing reconnaissance crews.

duties as soon as they arrived, most personnel were too busy to research their units' past combat experiences except in a cursory manner. Year after year, the war became a new experience for new batches of people who brought fresh perspectives and probably some reinvigorating enthusiasm, but who were largely blind to what had happened before.

On a more mundane level, rapid personnel changeovers hindered replacement crew training, and the problem may have been particularly acute in units specializing in tasks such as night operations. The 497th TFS specialized for a while in night interdiction missions known by the appropriate nickname Night Owl. Major Arvid Skogerboe estimated new pilots required 25 to 30 Night Owl sorties "to see what was on the ground effectively" and thus "to become effective."[48] Merely flying that many sorties did not assure proficiency unless new crews learned specialized knacks and techniques from their experienced predecessors, but training conditions were far from optimum. Lieutenant Barry Watts, who wrote the 497th TFS history for September 1967, lamented, "It is unfortunate that the majority of the squadron rotates over such a brief span of time. Despite the sincere efforts of everyone to pass along the intricacies of night work to the new troops, some of it has sadly been lost." Conflicting training and combat requirements prevented the same F-4 front and back seaters from flying together enough to refine their cockpit teamwork leading Watts to lament, "chaotic scheduling has hampered our effectiveness as severely as the weather."[49]

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[48] Skogerboe, OHI transcript, p. 5.
[49] 497 TFS History, Sept. 1967, p. 1.

The 497th TFS found that top night interdiction performance required minimal distraction with other mission types. After a few day missions, even veteran crews needed a couple sorties to feel comfortable again flying low through mountain passes at night looking for trucks. Switching between night and day flying also worsened the training problem when new crews arrived. A sprinkling of day flights added variety for experienced crews, but as large scale personnel rotations began, "day missions were only hindering our efforts to get the new crews proficient at night."[50]

Squadrons saw a direct connection between inadequate training and poor bombing results. Reviewing the bombing data gathered since July, the 497th TFS September 1967 history concluded, "The most interesting statistic – and the most significant – in terms of our effectiveness in stemming the flow of supplies south during darkness is the number of trucks sighted and the percentage destroyed. As the table suggests September saw an alarming decrease in squadron effectiveness." To explain the precipitous drop in claimed truck kills from 139 in July to only 16 in September, Lt. Watts opined, "The reason is simple: we are a new squadron learning the game."[51] Squadrons understood how such human factors led to variable bombing performance, but headquarters analysts may have been more likely to regard sorties as a uniform, interchangeable commodity. Official training regulations said crews were qualified to fly combat sorties by day or night regardless of whether they had acquired the intangible knack of spotting and hitting trucks at night. Statistics about sorties flown would not have captured the units' subjective

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[50] 497 TFS History, Sept. 1967, p. 2.
[51] 497 TFS History, Sept. 1967, pp. 9 and 4.

judgment that personnel turnover and schedule changes degraded bombing effectiveness in subtle, yet significant ways.

Personnel rotations in non-flying units could also adversely affect a flying unit's bombing performance. The Air Force developed several radar bombing techniques to permit weapon delivery despite the northeast monsoon's prolonged poor flying weather periods. By early 1966, radar-equipped B-66 pathfinder planes led fighters on "Buddy-Bombing" attacks, delivering fully 95% of the bombs dropped on North Vietnam that February.[52] Commando Nail was another method that used a suitably equipped strike aircraft's own onboard radar to find and bomb targets, but other programs called Commando Club or Combat Skyspot used ground radar sites to guide planes along a precise flight path at a steady speed to the proper bomb release point. Pilots would drop bombs when the radar controller gave them a radio signal. Skyspot derived from a Strategic Air Command system used routinely to track B-52s precisely during training flights and score their simulated bomb drops. The technique only worked within radar and radio range of American ground sites and was less reliable in the farthest reaches of North Vietnam. The requirement to fly straight and level when approaching targets also militated against using Combat Skyspot or related techniques in heavily defended areas.

Accuracy was a big question with radar bombing. The accuracy was clearly inferior to what pilots could achieve under clear weather conditions, but the Air Force preferred Combat Skyspot to the alternative of not bombing at all. Suitable targets needed

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[52] Headquarters PACAF, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, July 1965 – December 1966," p. 33.

to be rather large and away from populated areas. The radar controllers were key to mission success, but one pilot expressed ambivalent feelings about the controllers' skills when he noted,

> [W]e never really had the capability of assessing whether they [ground radar controllers] were good or bad as far as the results. It [Combat Skyspot] was a way of hitting choke points, main supply routes that they wanted plugged up ... we used it against truck parks when they thought that there might be something there and the weather was bad. And it was a way of getting bombs on the target. It was fairly good. But here again, they ran into the controller problem, which is part of the personnel business. A year tour, six months to train a guy and you get six months utilization out of him, and then you're right back training somebody new. So the effectiveness and the accuracy, I thought, of the Combat Skyspot was strictly dependent upon that guy on the ground and how well he could lock on to you and how well he was capable of running that particular track and getting your release. But it worked out pretty well as far as we could tell.[53]

Damage assessments of Combat Skyspot targets were often unavailable for a long time precisely because the technique was used when weather was too poor for visual bombing or aerial photography. Aircrews seemed to think seeing was believing when it came to BDA so they did not entertain high expectations for radar bombing without some way to verify where the bombs really hit. Assurances from the radar controllers were not enough to inspire strong confidence.

Official military chain of command hierarchies dictated the flow of most bombing data, but field units also engaged in their own informal information exchanges. Lieutenant Colonel Clark Allison and Capt. Howard Ankerman of 8th TFW intelligence stated that USAF wings in Thailand decided to share their OPREP-4 messages among themselves.

Allison found the information sharing very helpful for keeping updated about enemy targets. He explained that when planes from one wing attacked a target, bombs might blow away camouflage, revealing hidden supplies or trucks. Returning crews would report those observations on their OPREP-4s so the other wings receiving those electronic messages might be able to strike the newly revealed targets within hours. Allison said the information would have been out of date if it had gone to Seventh AF and come back down to the other units through normal channels.[54]

There were other examples of informal coordination between flying units. After President Johnson's April 1968 order confining bombing to south of the 19th parallel, the 8 TFW, 366 TFW, 13 TFS, 355 TFW, 388 TFW, and possibly additional units held a Red River Rats Informal Conference. Strategy development was not on the agenda, but the units sought agreement on the best ways to coordinate their efforts "to choke off the major LOCs by continuous pressure." The conference report concluded, "This strategy could best be implemented by area assignments by unit." The units subdivided the remaining armed reconnaissance area in Route Package 1 among themselves and divided their efforts into prearranged shifts whereby some units agreed to fly by night while others would concentrate on daytime. The rationale was simply that, "It was felt that this would improve unit interdiction and recce effectiveness."[55]

The combat wings' penchant for creating their own informal route packages within the official route package system suggested they did not think they needed a

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[53] Buhrow, OHI transcript, Sep. 28, 1967, pp. 32-33.
[54] Ankerman, OHI transcript, p. 6 and Allison, OHI tape.

comprehensive view of the war zone to bomb effectively. The informal route packages

did not arise from disagreement or unwillingness to coordinate. On the contrary,

conference participants thought having each wing focus on a small geographic area during

a certain time of the day would optimize interdiction results, probably because each unit's

pilots and intel personnel would become experts on the conditions prevailing within their

assigned slices of enemy territory.

The Red River Rats Informal Conference also reflected its participants' desire to

counteract perceived detractions from their bombing effectiveness. With constant

personnel rotations, units knew that their ability to attack heavily defended targets

accurately and with acceptable losses would quickly erode without rigorous training.

They agreed to conduct realistic multi-unit practice missions to maintain proficiency in

case future attacks against the heavily defended Hanoi - Haiphong area were required.

Ordnance delivery experience had also convinced the conferees that cluster bombs –

especially the CBU-24 - were the best weapon against trucks, troops, and AAA sites.

Units like the 497th TFS had already been collecting statistics supporting the CBU's

superiority over alternative munitions such as 500-pound bombs. The units agreed to use

similar locally developed statistics to lobby headquarters to send more CBU-24s to the

theater and to advocate that weapon's more widespread use.

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[55] 8 TFW History, Apr. – Jun. 1968, tab 24.

Assessment Validity Issues and Aircrew - Intel Tensions

The discussion thus far has portrayed a collegial relationship among flying unit personnel, but reality was more complex. Some tension usually exists between operational personnel such as flight crews and staff members such as intelligence officers. Rolling Thunder units were no exception. Although both parties generally agreed about the types of bombing effectiveness information to be collected, they sometimes clashed over how best to gather and interpret it. Disputes often involved the magnitude of effects achieved or the proper relative weighting between pilots' reports and aerial photography. Psychological factors also influenced professional relationships. The conflicting ideas may have led participants both to exaggerate and understate bombing's efficacy.

Unit intel staffs were pressured to file fast and accurate reports, but those requirements demanded careful scrutiny of what aircrews said during debriefings. Many intel officers emphasized the importance of verifying the information aircrews had given them individually and as a group. Major Vosper of the 388th TFW explained, "we thought it was extremely necessary to cross check the information gathered during the individual debriefs and during the gaggle [group] debrief to make sure that all ends met and jived. Occasionally – in fact at first frequently – we found out that we might get some different information out of the gaggle debrief."[56] The debriefings may have borne some resemblance to cross-examining witnesses during a court case.

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[56] Vosper, OHI tape.

Intense scrutiny of bombing results continued after aircrew briefings had been completed. To save work, Major Vosper said that his wing originally "used a consolidated type report for major strikes, meaning that with five flights in Route Pack 6 rather than writing five separate OPREP-4s, we would consolidate into one OPREP [4]." However, he explained that demands for more methodical reviews of each mission's results necessitated procedural changes, and recalled that in the fall of 1967, "there seemed to be so much reaction from higher headquarters on reports and that the extremely careful cross check of reports became necessary and we had to go finally into individual flight reports."[57] The wing commander decided that to ensure accuracy, many staff members, including himself, had to review and sign each OPREP-4. That extremely bureaucratized procedure led to late reports, and the commander eventually adopted a more streamlined procedure, but the episode suggested the wing staff's skepticism of aircrew statements and a willingness to employ rather drastic administrative methods to ensure accurate damage claims.

Aircrew post flight reports were initially the quickest and most common BDA source, but units began making increasing use of strike cameras installed in combat planes. Major Frederick Vosper stated that the 388th TFW was conducting what he called "test programs" in early 1967 to figure out how best to use F-105 strike cameras. At first, like the 8th TFW, the unit made little use of the equipment, but within months, "we had progressed, and to the point where we were actually able to make our initial reports from

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[57] Vosper, OHI tape.

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strike photography on the results of the mission raids, and we were printing BDA prints

which were being sent out to Seventh AF, PACAF, Thirteenth [AF], and other units that

needed them."[58] As noted earlier, the 388th TFW staff also began compiling strike camera

and gun camera film into a daily multimedia briefing for the wing commander.

The availability of strike photos showing bombs exploding sometimes complicated

assessment efforts. The outstanding advantage of strike imagery was that, unlike

reconnaissance photos, combat units had access to strike photos within minutes after their

airplanes had landed. On the other hand, squadron intelligence officers such as Captain

Ankerman thought strike photos had mixed implications. Sometimes, they corroborated

pilots' claims. Other times, they contradicted them, confronting intel officers with the

uncomfortable choice of believing either their squadron mate or the photos. However,

Ankerman observed that "a lot of times all you could see [in the photos] was a pile of

smoke down there from the bombs hitting. I would say this was the case about 50% of

the time." Overall, he concluded, "we didn't get too much from the strike cameras."[59]

Other flying unit intel analysts deemed strike photos more useful. Technical

Sergeant Glen Mallory agreed that "after about the third and fourth aircraft there was so

much smoke, haze, and other materials around the target area that it was hard to see

anything," but aircraft attacking from a different direction than the first few planes

sometimes obtained pictures showing where the previous planes' bombs had fallen.

Mallory specifically mentioned how, "We got this quite a few times when we ran the

[58] Vosper, OHI tape.
[59] Ankerman, OHI transcript, p. 12.

[Paul] Doumer bridge up at Hanoi. On the film from the last aircraft we could see we had certain spans down in the water." He felt, "Many times it [strike photography] turned out to be quite a benefit not only to our wing but to Seventh AF," and recalled an instance when strike photos revealed a previously undetected SAM site near a target. Seventh AF had doubted the site's existence until the strike imagery proved otherwise.[60]

Sergeant Mallory's supervisor in the 388th TFW, Maj. Vosper, saw strike imagery as a helpful way to supplement and validate aircrew reports. Vosper recalled, "We didn't get a large percentage of - shall I call it – false debriefs. Sometimes there were inaccuracies which I would not lay to the crew and there were periods where you could tell that something was not quite right; however, I would say that the strike camera photography helped to cut this almost to nothing." Recalling some cases where crews had tried to cover up incidents during missions, Vosper urged crews to admit mistakes because the wing could "take care of it" and avoid any serious repercussions.[61]

Major Vosper's remarks implied the imagery kept pilots honest and counteracted temptations to conceal bombing errors, but he was careful to explain that the wing used the film judiciously, and the film was "an exceptionally effective tool to show the commander what was happening. He never tried to use it, I would say as a tool against the men which it could have been because sometimes they were a little bit off target, but however, it was a good tool for everybody. They could see their mistakes, you could also

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[60] Tech. Sgt. Glen R. Mallory, OHI tape, n.d. (circa 1970), K239.0512-321, in USAF Collection, AFHRA. (The transcript will not be cited because it only paraphrases Mallory's words.)
[61] Vosper, OHI tape.

see the good things that were happening."[62] A later section will show that some flyers

were more skeptical about the motives of headquarters staffs that had access to strike and

gun camera imagery.

Strike photos certainly offered rapid feedback about where bombs had hit, but

aircrews and intelligence officers sometimes disagreed about what constituted desirable

target photography for mission planning. Pilots typically thought that newer pictures were

better than old ones. Major Buhrow's opinion that it was "just ridiculous to try to work

with photo intelligence"[63] that was more than several weeks old has already been

mentioned, but a former chief intelligence officer in Buhrow's wing held a different view.

Intelligence officers did not necessarily agree newer was better when it came to target

photos. Lieutenant Colonel Clark Allison acknowledged that some imagery was not

current, but thought the wing's supply of prestrike photography was good, and he

sometimes actually preferred the more "obsolete" photographs even if the targets

appearance had changed. He thought older photos sometimes gave better views of

surrounding terrain or showed the target from a better angle. His wing kept old pictures

as backups and used them if newer pictures did not give optimal target depictions.[64]

Some intelligence officers doubted the mere availability of target photos was

enough to counteract what they considered an Air Force predilection for accepting

overblown pilot claims. When pilots claimed extensive damage despite photos showing

lesser results, a few analysts concluded inflated damage reports were creating a dangerous

[62] Vosper, OHI tape.
[63] Buhrow, OHI transcript, Sep. 28, 1967, p. 28.

gap between bombing's apparent and real effectiveness. Morris J. Blachman, a USAF

intelligence officer in Vietnam, estimated "the actual destruction was often less than half

what the Air Force claimed." He thought improper integration of photo intelligence and

pilot reports caused the discrepancy and asserted that pilots often reported more damage

than photo intelligence could substantiate. Intelligence officers knew that exaggerated

pilot reports had been common since World War I, but Blachman thought Rolling

Thunder photo information "was consistently played down in favor of the far less accurate

pilots' reports."[65] James Clay Thompson was a Defense Department analyst who agreed

pilot reports were "frequently submitted without the substantiation of aerial photographic

reconnaissance."[66] Admiral Sharp's remark during his 1967 testimony before the Stennis

Committee that "Every day I read what the pilots have done the day before, taking the

pilot's reports, and I must say that day in and day out it is pretty significant"[67] did lend

some credence to what the critics were saying. Blachman concluded, "The result was a

grossly false picture of the military effects of the bombing."[68]

Skeptics did not think exaggerated pilot reports were the only problem. Blachman

maintained that "two reports of what happened were available - the accounts of the pilots

themselves and the evidence of the photo intelligence." He felt "The Air Force had, in its

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[64] Allison, OHI tape.

[65] Morris J. Blachman, "The Stupidity of Intelligence," in Charles Peters and Timothy J. Adams, eds., Inside the System, (New York: Praeger, 1970), p. 272.

[66] James Clay Thompson, Rolling Thunder: Understanding Policy and Program Failure, (Chapel Hill, NC: The Univ. of North Carolina Press, 1980), p. 93.

[67] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 1, Aug. 9, 1967, p. 71. (Cited hereafter as Senate Preparedness Subcommittee)

[68] Blachman, p. 272.

photo-intelligence techniques, remarkably accurate methods of measuring bomb destruction," but the photographic evidence seldom received the attention it deserved. When commanding officers received routine briefings on the previous day's activity, both poststrike photographs and pilot reports were usually available, but he felt "attention focused on the pilots' accounts." According to Blachman, "press briefings about the bombing were invariably condensations of the pilots' reports and were rarely corrected to conform to the evidence subsequently gathered by photo intelligence." Even when reports were later corrected, "the newspapers usually concentrated on today's bombing results rather than correcting yesterday's errors." Blachman lamented, "Although a few of us tried to challenge the system, we made no impact. The Air Force's claims, and not what we privately knew to be the truth, became the public record of the bombing of North Vietnam."[69] He believed that a combination of circumstances therefore gave the American public the false impression that bombing was highly effective.

Blachman and other analysts did not elaborate on all the factors he mentioned, but did specify ways information in pilot reports could become exaggerated. Blachman thought double reporting of destroyed targets was a common occurrence. When several aircraft bombed a target, more than one pilot might observe the same explosion and think his bombs had scored the hit. During debriefing, pilots might honestly report multiple targets hit when in reality only one had been hit two or more times, an effect Blachman called "duplication."[70] Presumably, the problem would have been worst when attacking

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[69] Blachman, pp. 272-275.
[70] Blachman, p. 273.

armed reconnaissance targets such as truck parks when the target's characteristics were

not known in advance.

Pilot errors were not the only source of duplication analysts envisioned. Even if

pilots correctly reported a target destroyed, poor communication or misunderstandings

might allow the same target to be bombed again. Close supervision probably minimized

that risk for fixed targets, and commanders intentionally ordered restrikes against targets

the enemy had repaired, but accidental restrikes against armed reconnaissance targets

might have been more likely. Thompson thought such errors meant, "targets reported as

destroyed one day were frequently attacked the next."[71] Pilots themselves described

attacking targets that had previously been destroyed. A forward air controller recalled an

instance when he called in a strike against two trucks stranded in the middle of a river.

Fighters successfully hit the trucks, but the controller's post flight intelligence debriefer

informed him the trucks had been there for years and, "This was the third time that they

had been personally debriefed to him as having been 'destroyed.' They were a perfect

decoy."[72] That particular incident happened after Rolling Thunder, but was probably not

an isolated case. With rapid personnel turnover and a turbulent training environment, such

incidents may have gone undetected – especially when inexperienced pilots searched

unfamiliar armed reconnaissance areas without guidance from FACs. When pilots

mistakenly bombed decoys or targets that had already been destroyed, the impact on

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[71] Thompson, p. 93.
[72] Col. Darrel D. Whitcomb, "Tonnage and Technology: Air Power on the Ho Chi Minh Trail," Air Power History, Spring 1997, pp. 6-7.

bombing statistics was hard to predict. The event could either be double reported or not reported at all. Either possibility introduced an error into bombing data.

Blachman cited contradictory damage reports as another source of duplication. He gave the example of an unspecified three-span bridge bombed three times in six days. A total of seven bridge spans were reported destroyed, but he said nobody seemed to notice the inconsistency.[73] He did not give details about the incident, so there is no way to tell if headquarters analysts detected and corrected the apparent discrepancy. In any event, a bridge is nearly equally useless whether it is missing one span or several.

Even if photo interpretation corroborated aircrew reports, misleadingly good results might have been reported if damage were less than either information source suggested. Aircrews understood that some targets sustained much less damage from seemingly devastating attacks than conventional wisdom suggested. Units commonly recorded the number of AAA sites silenced; yet heavy AAA guns survived repeated raids that killed the gunners but left the guns serviceable and ready to fire again the next time aircraft returned. Any strike photos taken during the attack would likely show bomb explosions engulfing the AAA site. The guns were small, mobile, easily camouflaged, and hard to see in post strike photographs. Colonel Broughton called for better munitions "that will kill the guns as well as the gunners" because "the ground guns are a most formidable threat to mission accomplishment."[74] Counting AAA sites silenced may have reflected only transitory success and inflated the apparent damage inflicted.

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[73] Blachman, p. 274
[74] Broughton, Thud Ridge, p. 222.

Disagreements between aircrews and intel officers were not always a point of contention. Aircrews were sometimes the ones who thought bombing effectiveness was being exaggerated. Lieutenant Barry Watts, an F-4 pilot in the 497th TFS, encountered an apparently deliberate form of effectiveness reporting inflation. He reported how squadrons sometimes concealed deficiencies by suppressing unfavorable bombing information. Watts noted, "In the case of ongoing combat operations, information that gives genuine insight into the actual effectiveness of units in the field will be of great interest to national decision makers in Washington, DC but, for a variety of reasons, may never surface into official reporting or documentary records."[75]

Watts based his conclusions on personal experience and did not even refer to intel officers' assessments. When he volunteered to write the October - December 1967 unit history for the 497th, he noticed the numbers of enemy trucks sighted and claimed destroyed during the night interdiction missions along Mu Gia Pass in which his squadron specialized had "decreased by a factor of at least five"[76] from the previous quarter. He realized the claims were probably exaggerated, but assumed claims made at different times would be equally exaggerated so comparisons should have revealed valid trend information. Experienced pilots he consulted blamed the lower claims on the onset of northeast monsoon weather, but Watts concluded his squadron's interdiction effectiveness was actually dropping. The lieutenant noted some pilots had acquired a knack for spotting trucks at night even in marginal weather. Only by first-hand experience could a flyer

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[75] Barry D. Watts, "Unreported History and Unit Effectiveness," Journal of Strategic Studies, vol. 12, Mar. 1989, p. 88.

develop that skill, but Watts concluded that most new pilots joining the squadron to replace others who had completed their tours were inadequately trained and were not learning the needed truck-finding skills from their more experienced predecessors.

Lieutenant Watts dutifully noted his embarrassing observations in the quarterly history and submitted it to his squadron commander who signed the report without reading it. Eventually a two-star general saw the report and angrily ordered it revised, leading Watts to conclude, "if the information on unit effectiveness is potentially embarrassing to local commanders, you should not be surprised if they ignore and willfully suppress it."[77] Senior commanders did not hear about any possible 497th TFS pilot training deficiency and assumed the lower truck kill claims were due to weather or some other cause beyond the squadron's control.

Watts' version of the 497th TFS quarterly history vanished from the official records and was replaced by a very different report written by another officer. The new version directly contradicted Watts by claiming, "The squadron was able to pass on the experience and knowledge of the old heads before they departed Ubon,"[78] and explaining the declining truck kills in a way that exculpated the squadron. According to the revised report, "The steadily declining truck kills over the preceding weeks suggested that the North Vietnamese delayed movement of large quantities of supplies for the free period [bombing pause] over Christmas and New Year's. Heavy truck traffic on the night of the 25th [December] supported this conjecture. Apparently they tried to push so much

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[76] Watts, p. 91.
[77] Watts, p. 97.

material through that trucks were still on the roads when the Christmas truce ended."[79]

Denial of an adverse connection between personnel changes, training, and unit bombing proficiency proved long lasting. When another crew rotation cycle peaked in 1968, the history for that interval stated, "May and June showed a high turnover in aircrews, but the squadron performance did not suffer in the least."[80] The unit roster shows Watts remained in the 497th until mid-1968, but he never again wrote the official history.

Squadrons did not always suppress bad news or try to overstate their achievements. Some units realized results were exaggerated and pilots applied corrective measures on their own initiative. Major Buhrow explained that 555th TFS pilots "felt that the bomb damage assessment was greatly exaggerated. It always looks much better when things are going off than it actually is." To correct the exaggeration, a few experienced pilots debriefed other crews after missions and obtained a copy of the OPREP-4, "stating what we figured was the damage done to the target." Then those debriefer pilots would scrutinize any available strike photos. Buhrow stated, "I know in my flight we reduced the bomb damage assessment claims, I'd say, by 75 percent when I suddenly realized that they just weren't seeing what they thought they were seeing."[81] Whether the 555th TFS effort was typical or an isolated case is unclear, but it shows that intelligence officers were not the only ones who questioned bomb damage assessment validity.

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[78] 497 TFS History, Oct. – Dec. 1967, chap II.
[79] 497 TFS History, Oct. – Dec. 1967, p. 2.
[80] 497 TFS History, Apr. – Jun. 1968, p. ii.
[81] Buhrow, OHI transcript, Apr. 11, 1968, p. 25.

Although damage overestimation seemed to be a more common occurrence,

Rolling Thunder aircrews and staff members also complained about underestimating

results. Combat pilots sometimes had less confidence in photo interpretation than intel

analysts like Morris Blachman. Colonel Broughton complained that unless post-strike

photos showed enough damage, another attack would be scheduled, perhaps with tragic

results. He thought the method used to assess the photographs was inadequate because,

> You can have as many assessments of damage as you have viewers of the
> pictures. Unfortunately, the … photo interpreters are not always of the
> highest level of skill or experience, and their evaluation quite often does
> not agree with that of the men doing the work. I have bombed, and seen
> my troops bomb, on specific targets where I have watched the bombs pour
> in and seen the target blow up, with walls or structures flying across the
> area only to be fragged right back into the same place because the film
> didn't look like that to the lieutenant who read it way back up the line. I
> have gone back on these targets and lost good people and machines while
> doing so, and found them just as I expected, smashed.[82]

Significantly, Broughton was the same man who had noted how intelligence

officers underestimated damage to AAA guns, showing that the same people recognized

how BDA could either exaggerate or understate damage.

One source of the pilots' doubts about intel findings was their belief that photo

interpreters and other analysts applied unreasonable or inconsistent standards when

deciding whether targets had been adequately damaged. Broughton admitted, "the photo

guys are sometimes quite correct. If the complex is large enough, they can sometimes tell

what percentage of the structures are still standing and how effective the complex may still

be." However, he thought interpreters often demanded "each and every outhouse

flattened" before they would consider a target destroyed.[83] Despite standardized OPREP-4 forms and computerized data processing, Broughton noted "differences in how the results got reported at debriefings and how the intelligence people analyzed the strike photos. If you ever wanted to point at two areas that were subject to the whims and imagination of the moment, they would have to be reporting and intelligence."[84]

Tensions between crews and intelligence officers could transcend mere differences of opinion. Flyers sometimes placed their conflicts with intelligence officers on the level of personal honor. Colonel Olds, 8th TFW Commander, was outraged not by the fact that intelligence kept reporting targets serviceable after attacks, but by the intelligence officers' inference that crews were not bombing accurately. He described post strike photos as "badly, badly interpreted" and said, "PIs [photo interpreters] did not understand nor did intelligence seem to understand" what was really happening in the air war. Olds cited rail yards as a specific example. Describing attacks against the Phuc Yen yard, he said, "They'll take a picture of it the next day and they'll credit you with all the near misses but you never hit the railroad track. Why? Because they [North Vietnamese] fixed it overnight, that's why. And how many times we had to go back to the same damn target because it had been fixed overnight. Not for the reason that it now existed again but for the reason they thought we had missed it. And that really hurt. As a matter of fact, it burned me up."[85]

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[82] Broughton, Thud Ridge, pp. 97-98.
[83] Broughton, Thud Ridge, p. 98.
[84] Broughton, Going Downtown, p. 201.
[85] Olds, OHI transcript, p. 37.

Olds' diatribe illustrates BDA's human dimension – particularly at the flying unit level where aircrews literally died trying to destroy targets. Sterile, factual damage reports did not satisfy aircrews and field units. Reports also needed to accommodate the fierce pride typical of aircrews. Cold, passionless intelligence assessments that slighted those emotional needs aroused angry resentment, probably exacerbated by the feeling that political restrictions were artificially placing victory out of reach. Pilots may have felt a sense of futility as they flew their missions, but any suggestion they were not proficient or professional was intolerable. Just as pilots might boast about destroying more targets with less ordnance, they bristled at the suggestion their proficiency was substandard.

There was perhaps a fine line between having a strong sense of professional pride and being unwilling to accept intel officers' findings that impugned aviator's reputations. When describing desirable attributes of end-of-tour-reports, Col. Olds said he liked to see "facts, cold, hard figures, you know, something they can really work with," but he was worried such figures could be twisted around into conclusions that air power had accomplished nothing. Olds adamantly insisted, "I think our Air Force has done an absolutely magnificent job in conducting that war."[86] One could almost construe his words to mean he knew air power was effective whatever the data might show and anyone who disagreed must have distorted the facts.

Intelligence officers were conscious of these aircrew sensitivities and took measures to mitigate tensions. Lieutenant Colonel Allison, 8th TFW intel chief, was also a

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[86] Olds, OHI transcript, p. 86.

qualified F-4 back seater who flew combat missions. He said, "I personally felt, myself, one, by flying with the crews of course I had a better insight, a better way to evaluate the debriefings, to know more about what was going on. Second, it established a rapport with the crews. The crews really couldn't 'snow' you."[87] He noted that nearly all his wing's intelligence personnel flew combat missions aboard some sort of aircraft, such the C-130 Lamplighter flare-dropping planes that operated at night over lightly defended interdiction areas, mostly in Laos. He strongly endorsed having all intel personnel fly combat to boost unit morale and *esprit de corps* since crewmembers would then accord those men extra respect. Captain Ankerman was another 8th TFW intelligence officer who thought flying combat missions "gave me more rapport with the crews, and, as a briefer, I could tell I had more relevance and I could relate with some of their experiences more so than some of the other briefers who did not fly."[88]

Despite their best efforts to work with the crews, intelligence officers still received variable amounts of cooperation. Lieutenant Lawrence Taylor found reconnaissance crews from the 432nd TRW extremely cooperative and recalled, "We got quite extensive information from the crews. They were really helpful … we did get a lot of feedback from them."[89] Captain Ankerman served in both the 8th and 388th TFWs and found widely divergent crew attitudes during debriefings depending on the route package to which the missions had flown. After routine Route Package 1 sorties, crews "would be anxious to get out [of debriefing] and get over to the club and celebrate and the debriefing would be

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[87] Allison, OHI tape.
[88] Ankerman, OHI transcript, p. 13.

rather hard." Conversely, the more complex Route Package 6 mission debriefs were

"much more business-like," and frequently took less time than the more routine

debriefings.[90] When debriefing in the 388th TFW, Major Frederick Vosper also found that

"the biggest problem probably in debriefing was impatience of aircrews and being able to

get the proper information out of them." To expedite debriefings, Vosper filled in as

much OPREP-4 data as possible before crews landed because "if you waited until they

came back to try and start this stuff you'd lost half the ballgame." He said completing the

maximum amount of paperwork in advance became even more important as headquarters

demanded increasing numbers of forms since "this could save a lot of time, particularly

when you got to the point later on where you were reporting everything under the sun."[91]

Squadrons tried to obtain needed information despite occasional aircrew reticence

with intel debriefers. When aircrews could leave Southeast Asia after flying 100 combat

missions over the North, some units such as the 388th TFW had pilots who had already

completed their 100 missions and were waiting for new assignments debrief crews after

the intelligence officers had finished with them. The experienced aviators sometimes

proved able to elicit additional information the aircrews had not shared with intel.

The clash between aircrew and intel bombing effectiveness interpretations is a

complex phenomenon that resists definitive explanation, but a few speculations may shed

some light on it. Destroying only key portions of most targets should have rendered the

facilities unusable so there should seldom have been a need for complete obliteration.

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[89] L. Taylor, OHI tape.
[90] Ankerman, OHI transcript, p. 4.

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Perhaps the close political scrutiny and limited number of authorized targets meant facilities were not considered destroyed unless photographs showed them to be in complete ruins even if a lesser degree of damage might have rendered the facilities functionally useless. One could imagine how a trained photo interpreter might recognize that apparently slight damage had rendered a factory inoperative, but a less trained senior official might demand more obvious and visually impressive damage. On the other hand, aircrews were not trained intel analysts and might therefore have been unqualified to interpret photos correctly.

Lingering tensions between flyers and intel analysts were a fact of life in flying units, but were not a serious impediment to bombing assessment at that level. Combat units shared in Rolling Thunder's frustrations, but complete harmony and agreement about how to interpret results would have been unlikely even under the best circumstances. Disagreements probably had a healthy compensating effect on the units' overall interpretations, offsetting some exaggerations and understatements.

Assessment Clashes – Flying Units versus Headquarters

Internal frictions within flying units mirrored larger discrepancies between how those units and higher authorities judged bombing effectiveness. Many squadron and wing personnel believed senior officials made some wrong decisions about how to plan, perform, and assess bombing.

[91] Vosper, OHI tape.

The prevalence of aircrew complaints about bombing restrictions might lead one to assume aircrews wanted to escalate attacks, but aircrews did not automatically think heavier bombing would bring better results. Admiral Sharp and other senior officers consistently sought approval to attack more targets, but some aircrews doubted that strategy would improve bombing effectiveness or that traditional air power targets like North Vietnamese factories were always worth destroying. Explaining why he disliked attacking the railroad leading northeast from Hanoi to the Chinese border, Col. Broughton said, "The targets were blah targets, and they were all heavily defended. We smashed most of the worthwhile ones fairly early on, and after we had knocked out the better targets in other complexes to the west of the railroad and toward Hanoi, the North Vietnamese loaded the railroad with guns from these other areas and then moved them up and down the line as needed." Broughton did not regard industrial targets as particularly worthwhile either, characterizing attacks against the Thai Nguyen steel plant as "the belated and hesitant step of pressing the attack against North Vietnam's symbolic experiment in industrialization."[92] His disparaging remarks contradict the stereotypical Air Force fixation on bombing strategic industrial targets, but underscore the perceived determination of headquarters commanders to strike targets that at least some flyers judged to have questionable value.

A related issue often arose when aircrews objected to what they deemed excessive repeated attacks against the same targets. Major Robert Buhrow, a 100-mission veteran,

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[92] Broughton, Thud Ridge, pp. 215 and 138.

felt some repetitive attacks happened when headquarters ignored aircrew damage reports

– specifically about rail yards at Kep, Thai Nguyen, and Viet Tri. Buhrow explained,

> [W]e'd go in one day, and as you rolled in on the bomb run, and you'd
> look down and see Kep railroad yard, and all it would be would be one big
> bomb crater. That's all that's there. ... There's nothing there. It's wiped
> out. The next morning you'd go down and look at the frag, and where are
> you going? Kep railroad yard. And three or four days of that, and you'd
> get a little disgusted. ... It seemed like regardless of what you said,
> regardless of what the photos showed, they decided that we should hit Kep
> railroad yard.[93]

Seventh AF was probably the headquarters that decided whether a target like Kep

railroad yard required additional air strikes, but crews did not confine their criticisms to

that headquarters. After Col. Broughton led a strike against the Viet Tri electric power

plant, he cynically concluded, "the plant was destroyed as far as those of us in the fighter

force who had been there were concerned. As usual, that meant nothing. Possibly the

poststrike photo recce coverage didn't satisfy Seventh [Air Force] or PACAF or

Washington, but a few days later somebody directed a special four ship strike on the Viet

Tri thermal power plant."[94] Crews thought if headquarters paid more attention to pilots'

reports, then better targeting decisions would result.

Headquarters decisions about which approved targets to attack were not easy, but

aircrews often commented about the tendency to judge a target's value by how vigorously

the enemy defended it. Crews expressed mixed attitudes, applying entirely different

standards to fixed targets than to armed reconnaissance targets. Flyers deemed the

intensity of enemy defenses an unreliable barometer of fixed target value. Colonel

Broughton lamented that senior leaders "assume they must be protecting something very

valuable, yet our pilots return and say there is nothing there but [AAA] guns. We back

ourselves right into the corner we abhor and wind up dueling fixed gun positions, and then

we wonder how we lost so many people and machines on little targets or little pieces of

larger targets."[95]

Major Buhrow castigated Seventh AF for erroneously judging mission results

against fixed targets by the intensity of antiaircraft fire. He said,

> A big deal as far as 7th was concerned, as to whether we were hitting
> something important or not, was the amount of defensive reaction we got,
> and this came out in the – I think it was the OPREP-4 – wrap-up each day
> that we got the following morning. It'd say, boy, we really hurt them
> yesterday, because they shot like a bunch of beggars. And, shoot, if they
> know you're coming back every day three days in a row, why, I'd ... load
> those [AAA] guns, too, because what've they got to lose[?] You're not
> hitting anything. And this was kind of grim as far as we were concerned.[96]

Conversely, crews regarded ground fire as an auspicious sign of worthy armed

recce targets - especially in the lightly defended southern panhandle - where finding good

targets was often challenging. Few vehicles moved by day when visibility was likely to be

good. Most moved by night, but they were obviously hard to see. An 8th TFW wing

history commentary about one night armed reconnaissance mission noted, "They [aircraft]

began getting ground fire even before they dropped flares, which was usually a good

indication of a lucrative target in the vicinity."[97] During the same interview when he

[93] Buhrow, OHI transcript, Sept. 28, 1967, pp. 8-9.
[94] Broughton, Going Downtown, p. 148.
[95] Broughton, Thud Ridge, p. 98.
[96] Buhrow, OHI transcript, Sept. 28, 1967, pp. 9-10.
[97] 8 TFW History, Apr. – Jun. 1968, p. 28.

criticized Seventh AF for judging target value by ground fire intensity, Maj. Buhrow

stated, "we had the theory that if we rolled in on a target and received ground fire, there

was something there. It appeared that if they didn't have anything to protect, they weren't

going to shoot. If there was something down there, then they started firing. Well, if you

got into a mess of trucks at night, they were going to play with you."[98]

Aircrew attitudes about judging target value by ground fire intensity may appear

inconsistent but were actually rather rational. Fixed targets were, by definition, at known

locations so there was no need to rely on enemy behavior to reveal them. Defenders knew

American habits and could anticipate repeat strikes against fixed targets so they prepared

by massing antiaircraft weapons. Repeatedly attacking heavily defended fixed targets

forced aircraft to run a gauntlet of concentrated defenses even if the target were already

heavily damaged. Armed reconnaissance missions were different because they engaged

targets of opportunity. Except for strongly defended areas such as important railroad lines

or somewhere in the Hanoi-Haiphong vicinity, defenders were uncertain when or where

attacks might come and were unlikely to have massed antiaircraft weaponry. Pilots

deemed the advantage of finding potentially valuable but elusive armed recce targets

worth the added risk of facing ground fire. However, headquarters planners may not have

appreciated the fine distinctions pilots drew between ground fires encountered on different

mission types.

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[98] Buhrow, OHI transcript, Sept. 28, 1967, p. 31.

Uncertainty about targeting choices and bombing effectiveness mixed with a sense

the campaign was generally successful was evident among some flying unit members.

While a colonel, Brigadier General Cleo M. Bishop was vice commander of the 388 TFW

at Korat, Thailand. When asked after the war about Rolling Thunder targeting and

bombing results, he replied, "I don't know if I am in a position to say how effective the

targeting was. It didn't appear to take them long to get a [railroad] track through there

again once you knocked them out. I would hope that knocking out those bridges and

railroad marshalling yards, and whatnot, certainly must have slowed down the movement

of war materials to South Vietnam. I suppose that was as good a targeting system to go

for as any." Despite his uncertainties, Bishop "thought the targets were fairly intelligently

selected" and that air power had "made a significant contribution" to the war. He was

reluctant to speculate what might have happened without the bombing, but said, "I would

have to believe that the fighting in South Vietnam would have cost a great many more

casualties if it had not been for that war effort over the north."[99] Later chapters will show

that Bishop's mixed opinions resonated among headquarters and administration officials.

Once headquarters commanders had decided what to bomb, the prescribed strike

and reconnaissance procedures generated additional aircrew qualms. As previously

explained, attacking a limited number of targets repeatedly until photographs depicted a

prescribed level of damage was a common complaint, but wasting missions on targets that

had already been obliterated was not the pilots' only grievance. They also believed the

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[99] Brig. Gen. Cleo M. Bishop, OHI transcript, Jul. 7-8, 1976, K239.0512-904, in USAF Collection, AFHRA, pp. 162-163.

consequent loss of surprise detracted severely from bombing's potential effectiveness. Repetitive attacks were costly because the North Vietnamese concentrated SAMs and AAA around targets after the Americans' first attack, knowing more attacks would follow. As Broughton explained, "They know we will be back, and they know we will be back again, probably from the same direction at the same time of day and with the same number of aircraft."[100] Even if ground fire intensity had correlated with target value, crews would have preferred less predictable mission profiles. Frag orders came from Seventh AF so that headquarters attracted many of the complaints.

Reconnaissance pilots also objected to overly standardized targets and mission profiles. Major Olive Hines, veteran of a hundred RF-4 missions from 1966 to 1967, said RF-4s often photographed targets so predictably after strikes that "It got to the point where the North Vietnamese were expecting us five or ten minutes after the strike."[101] Waiting several hours or longer mitigated the problem. The delay was sometimes a deliberate attempt to make flights less predictable, but target characteristics also increased reconnaissance mission randomness. Hines noted that ten minutes was long enough for smoke to clear away from most targets and allow clear photography; however, POL fires often burned for hours so waiting until the fires subsided yielded better photos. Seventh AF planners seemed aware of such factors and fragged recce flights accordingly.

Reconnaissance pilots also felt headquarters mandates could hamper bombing data collection. Major Hines said that recce pilots were initially free to select their own routes

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[100] Broughton, Thud Ridge, p. 98.
[101] Hines, OHI transcript, p. 5.

recommended letting the wings tell Seventh AF which ordnance they desired and assigning experienced combat pilots to the Seventh AF staff where they could help build the daily frag orders.[104] Lieutenant Colonel William Van Gilder recalled a different ordnance mismatch involving the Thai Nguyen steel plant. He did not say who was to blame, but thought 3000-pound bombs would have been a better choice than 750-pounders because "I don't think the 750-pounder was doing the job that the 3000-pounder could have done," necessitating extra missions to destroy the target.[105]

The route package system headquarters had established may have helped planners de-conflict Air Force and Navy operations, but aircrews thought the arrangement degraded bombing effectiveness by skewing sortie distribution across different areas. Major Skogerboe observed that monsoon weather often obscured Route Package 6 targets, forcing in-flight diversions to backup targets in Route Package 1. Targets in the Navy-controlled RPs 2, 3, and 4 were effectively unavailable because Air Force planes needed Navy permission to enter those areas and in-flight diverts left insufficient coordination time. The resulting RP 1 sortie deluge was disproportionate to the limited number of valid targets available. Skogerboe said, "this literally got to thousands of sorties going in there. And much of the effort we felt was wasted in road interdictions and missions that were, could have been utilized to better advantage in other places."[106] Sortie statistics alone might have suggested that the intense interdiction in RP 1 was offsetting

[104] Buhrow, OHI transcript, Sep. 28, 1967, p. 4.
[105] Lt. Col. William S. Van Gilder, OHI transcript, Jun. 20, 1968, K239.0512-065, in USAF Collection, AFHRA, pp. 12-13.
[106] Skogerboe, OHI transcript, p. 6.

and altitudes when photographing targets. They remained free to select their own flight paths, but when Seventh AF began restricting recce missions to a minimum altitude of 4500 feet, Hines said losses increased because the higher altitude made planes more visible on enemy radar, giving defenders more advance warning of their approach.[102]

Conversely, Hines complained that headquarters often give reconnaissance pilots insufficient guidance about why they were photographing a target or the type of information desired. He thought more explicit instructions would have helped crews obtain the desired imagery on the first attempt: "The pilot says, OK I am going after this target because I may need if for a certain type picture or they need certain information from it therefore I may be able to approach it from a certain direction, a certain angle and so forth." Hines suspected, "for some reason or other we weren't trusted with this information" so the crews often did not bring back exactly what the headquarters wanted, necessitating another mission. Sometimes, planes were shot down while flying back to photograph the same target a second time.[103]

Flying some strike missions with inappropriate ordnance is practically unavoidable during aerial warfare and such mismatches occurred during Rolling Thunder. Pilots often thought they knew better than headquarters planners how to ensure proper weapon loads. Major Robert Buhrow recalled flak suppression missions loaded with 750-pound bombs instead of the much-preferred CBU-24 (cluster bombs). He held staff planners primarily responsible for those errors. To alleviate the ordnance mismatch problem, he

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[102] Hines, OHI transcript, pp. 3-5.
[103] Hines, OHI transcript, pp. 8-9.

the reduced flying in the more northerly areas, but a more accurate interpretation would need to allow for reaching a point of diminishing returns in RP 1. Skogerboe's remark is further evidence that pilots did not equate more sorties and bombing with greater effectiveness. Additionally, his idea that the sorties' geographic distribution correlated with bombing's success matched the view of some headquarters officials who tracked percentages of sorties flown per route package. A later chapter will describe how headquarters reports characterized some sortie distribution patterns as better than others.

Flyers did not always view route packs as impediments. Colonel Broughton said route packs even improved aircrew performance because, "If we worked pretty much in the same area each time we were up there it gave us a better shot at knowing the terrain and targets. We also developed a better feel for the constantly moving defenses." Describing RPs 6A and 6B, Broughton said the split between the two zones "was far from a hard line and we constantly moved around in each other's area, with the navy choppers darting in to save a shot-down air force pilot or with us refueling in their area when we came up the water route to the northeast railroad. We always worked together to get the job done."[107]

Headquarters had established the route packages to divide operations geographically, but used other procedures to divide operations temporally. Tasking different units and services to fly at different times may have reduced scheduling conflicts, but some crews thought interdiction results were suffering because headquarters allowed

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[107] Broughton, Going Downtown, pp. 110-111.

day and night operations to become virtually separate campaigns. Inadequate information

exchange between day and night operations was a primary problem. Major Skogerboe

noted, "there seemed very little coordination between the day and the night effort. ... The

efforts done during the daytime were very seldom used in developing lucrative targets for

the nighttime."[108] He thought crews returning from day armed reconnaissance sorties

knew best where to look for night targets, but distributing that perishable, time-sensitive

information to the crews preparing for night flights was difficult because different

squadrons were involved. Seventh AF was the logical agency to integrate day and night

interdiction, but was not providing the coordination aircrews desired. The problem was

related to previously described suggestions Skogerboe made about speeding up photo

reconnaissance film development and interpretation.[109]

Flying unit personnel also vented frustrations directly at authorities beyond the

military chain of command. Probably the most pervasive complaints involved the

apparently arbitrary political restrictions on targets and attack methods. Most pilots

agreed the rules of engagement impaired bombing effectiveness and endangered lives.

John Nichols was a Navy F-8 pilot who lamented, "At times it seemed as if we were trying

to see how much ordnance we could drop on North Vietnam without disturbing the

country's way of life."[110] Colonel Broughton, a stern critic of senior military and political

leaders alike, complained, "It's tough to win a war in Asia with an attack plan based on

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[108] Skogerboe, OHI transcript, pp. 19-20.

[109] See Skogerboe, OHI transcript, p. 11.

[110] John B. Nichols, and Barrett Tillman. On Yankee Station: The Naval Air War over Vietnam. (Annapolis, MD: Naval Institute Press, 1987), p. 16.

the whims and schedules of the Oval Office rather than a calculated interdiction plan."[111]

Douglas Whatley, an F-105 squadron commander wrote in 1971 that, "The fact that

United States airpower failed to accomplish its objectives cannot be attributed to inability

or impotence of that airpower. It is the author's opinion that airpower failed to

accomplish its objectives because political, not military decisions dominated the direction

of the air war."[112] Reconnaissance flights continued despite the administration's bombing

pauses and Major Olive Hines complained that RF-4 aircraft losses increased drastically

during and after pauses. His reconnaissance unit once lost one sixth of its pilots in a single

day following a pause. Hines believed the heavy losses happened because "the North

Vietnamese were able, in fact, to resupply themselves completely and be ready for heavy

defense ... following the end of the bombing pause."[113] Flyers accepted the need for some

rules of engagement, but deemed the administration's rules fickle and irrational.

Some bombing restrictions derived from administration fears that vigorous attacks

against MiG airfields might drive North Vietnamese planes to operate from Chinese air

bases, confronting the U.S. with an even more politically charged situation, but potential

diplomatic consequences of dueling Chinese-based MiGs over North Vietnam did not

trouble combat aircrews. The North Vietnamese Air Force (NVAF) did base some MiGs

in China, but kept a minimum number based in North Vietnam to challenge Rolling

Thunder missions. Aircrews actively welcomed the prospect of driving the MiG bases out

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[111] Broughton, Going Downtown, p. 120.
[112] Col. Douglas E. Whatley, "The Effectiveness of U.S. Airpower in the Air Campaign over North Vietnam," Air War College Research Report No. 4017, (Maxwell AFB, AL: Air University, 1971), p. 33.
[113] Hines, OHI transcript, p. 3.

of the North. John Nichols, a U.S. Navy carrier pilot, wished all the MiGs would move to

China because "it would have placed NVAF interceptors much farther from our operating

areas, and would have allowed us to establish CAPs [combat air patrols] easily positioned

to intercept them southbound."[114]

After the missions had flown, assessing their results strained relations between

flying units and headquarters. Stresses within units between pilots and intel officers were

matched by analogous disputes with headquarters that reached extreme proportions in a

few exceptional cases. Colonel Broughton described a case where PACAF commander

General John Ryan accused his unit of totally missing targets because no craters were

visible in post strike photos. Broughton tried to explain that his unit had been ordered to

set the bombs to explode instantly on contact so the explosions left practically no holes in

the ground, but Ryan rejected that explanation. In a few cases flying personnel even

contended headquarters staffs turned some assessment methods into ways of monitoring

aircrews. Broughton was exceedingly suspicious of headquarters officials. The F-105 gun

camera film could not be developed at his base so the photo lab sent it directly to Seventh

AF for processing. The gun cameras were supposed to help pilots assess their shooting

skills, but Broughton asserted that his crews never got to see their film and "Gun camera

film was for the various headquarters to monitor what fighter pilots fired at, to be sure

that there were no violations of the off-limits rules."[115] Broughton's Orwellian sentiments

were atypical and may have reflected the severe 1967 professional altercation between him

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[114] Nichols and Tillman, p. 18.
[115] Broughton, Going Downtown, pp. 234, 238, and 223.

and General Ryan. The details are not relevant to this investigation, but the experience embittered Broughton.[116]

Some pilots thought Seventh AF's reconnaissance photo processing methods delayed feedback about bombing results. Major Hines reported that recce planes were often fragged to land at Seventh AF Headquarters near Saigon after photographing "JCS priority one targets." When numerous recce planes – many of which were based in Thailand – landed at Tan Son Nhut, the influx "cluttered up" the Seventh AF photo processing system while leaving the recce planes' home base photo processors idle. Hines recognized "our aircraft and pilot [photo] capabilities right now are really greater than our processing and interpreting capabilities" and argued that inefficient workload division between headquarters and unit photo processors made the already overburdened system work even slower. He called for improved procedures and doubling or tripling quantities of photo processing equipment in Southeast Asia.[117] Aircrews thought such workload orchestration should have occurred at headquarters.

Intel personnel also expressed dissatisfaction with headquarters policies and sometimes doubted their headquarters counterparts were sharing important information with them. Without adequate background knowledge about the strategic situation, they feared losing their aircrews' respect. Unit intel personnel therefore felt isolated from both their own crews and headquarters. Captain Ankerman recalled, "the intelligence shops were mainly in the dark as to what was going on over in Southeast Asia compared to

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[116] Broughton describes this incident in Going Downtown.
[117] Hines, OHI transcript, pp. 9-10, and 13.

some of your higher level organizations; you really didn't know what was happening." He specifically thought headquarters had had prior warning about the 1968 Tet Offensive, but his wing was caught by surprise and "this lack of intelligence that we were suffering, this being kept in the dark ... tended to hurt your credibility with the aircrews which was the biggest problem for we briefers."[118] The aircrews' lack of confidence in unit intel officers who did not seem to know much more than they did about the war hampered intel's efforts to obtain aircrew cooperation when assessing bombing.

Flying unit intelligence personnel had additional concerns about how their Seventh AF counterparts were handling bombing assessment information and felt their units were not receiving adequate feedback. Intel officers diligently sought additional BDA from headquarters – frequently with limited success. Photos were usually available for important fixed targets, but intel officers shared aircrew concerns that photos were too slow to reach to flying units.

Unit intel staffs often expressed dissatisfaction with any BDA imagery they did receive from headquarters. Technical Sergeant Glen Mallory, 388 TFW Target Intelligence Branch noncommissioned officer in charge from early 1967 to early 1968, recalled, "The BDA photography that we got most of the time did us very little if any good at all. Many times it would be just a very narrow strip of film which showed us no area, just maybe target coverage of which maybe it was cloud cover, dust, smoke, haze. It was just you might say nice to look at material."[119] Mallory's supervisor, Maj. Vosper,

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[118] Ankerman, OHI transcript, p. 14.
[119] Mallory, OHI tape.

said the wing "got too much of the stuff we didn't need," but not enough of the imagery

the wing wanted to see.[120]

Photographs showing night interdiction results were exceptionally hard to obtain

from Seventh AF, prompting Lt. Col. Allison to say, "We grew to accept the fact that we

really wouldn't have any BDA" for those missions. Units were especially frustrated when

extra efforts to procure BDA failed for no apparent reason. Allison described many cases

where RF-4s took night photography of his wing's night interdiction results, but Seventh

AF never provided any pictures despite his repeated phone calls and visits. According to

Allison, Seventh AF said the requested imagery could not be found because the photo

processors were overwhelmed with millions of feet of film, but Allison deemed that

explanation implausible because he had immediately provided all the details about which

RF-4 had taken the pictures and at what time.[121]

While bombing units' intel staffs complained about the scarcity of BDA photos,

their recce unit counterparts complained about producing too many photos and sometimes

disregarded headquarters taskings they deemed unreasonable. Lieutenant Lawrence

Taylor of the 432nd TRW recalled, "The distribution of photo products was a real bugaboo

for us." His wing flew mostly RF-4s during his yearlong tour beginning in September

1967, and the demand for photos grew constantly. One reason for the increasing demand

was that once an organization had been added to the photo distribution list, there was

apparently no way to remove it even if the organization no longer existed. Some

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[120] Vosper, OHI tape.
[121] Allison, OHI tape.

headquarters organizations also made what Taylor considered "ridiculous" photo requests.

The B-52s operated under SAC rather than Seventh AF control, and in order to evaluate

bomb runs, SAC wanted literally thousands of prints of each B-52 strike. Furthermore,

Taylor reported that SAC wanted pictures taken immediately after the bombs had

exploded so the pictures showed "nothing but dust balls." He admitted, "There was no

way we could turn this much film out so we said to hell with it." Claiming the RF-4's

cameras had malfunctioned, his unit printed a few dozen images, "and you could still see

the same thing" as would have been visible in the thousands of prints requested. That

policy extended to other bombing as well. Taylor said, "if we didn't consider a target had

had any new activity around it, we wouldn't overlay it. We wouldn't print it because it

involved too damn much work. We would send it on to our next echelon to do it."[122]

Much like their concerns about not being warned about impending strategic events

like the Tet Offensive, intelligence staffs desired quality BDA from headquarters because

they saw a direct linkage between procuring adequate BDA, sustaining crew morale, and

convincing aircrew to cooperate with intel debriefers. Lieutenant Colonel Allison said he

was very disappointed about not getting requested night interdiction BDA from Seventh

AF because, "This [BDA photography] would have done much for crew morale. It's

amazing how if crews can see what damage they've done, particularly on the night

missions, when night after night you never know what damage has been done."[123] Major

Vosper pointed out that,

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[122] L. Taylor, OHI tape.
[123] Allison, OHI tape.

it's a very big morale problem in trying to keep the crews going and to really keep them gung ho ... This has a lot to do with their support and their participation in your intelligence activities. ... What it boils down to is you need BDA photographs of what your crews have covered and you need good photography on it and you need it in a real timely manner and I really can't stress enough the importance from the morale factor and from the cooperation with intelligence.[124]

Unit intel officers resorted to informal information gathering methods when they felt headquarters was not keeping them adequately informed. Lieutenant Colonel Allison developed a large "local intelligence" program in the 8th TFW when he was unable to obtain desired information from Seventh AF. He noted that Seventh AF assigned flare-dropping C-130 aircraft called Lamplighters to orbit certain lightly defended areas and drop flares each night looking for enemy movements. Lamplighters directed fighters to bomb any targets the flares revealed. Most Lamplighter activity was along the Ho Chi Minh Trail in Laos rather than in North Vietnam proper, but the situation illustrated problems with how headquarters controlled Rolling Thunder bombing assessment as well. Weather diverts from other areas sometimes brought in many more fighters than there were targets. Allison doubted the existing Lamplighter tactic's viability because "once you orbit a certain point, keeping flares lighted all the time there's not an awful lot of activity that's going to be moving through. ... we felt this was a considerable force to be just in some cases wasted dropping bombs in areas that really nothing was there."[125]

Allison's attempts to recommend improved Lamplighter tactics or to obtain better data upon which to make independent decisions about where to look for nighttime targets

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[124] Vosper, OHI tape.
[125] Allison, OHI tape.

were unproductive. The proliferation of headquarters intelligence organizations prompted him to shop around for the needed information. At Seventh AF, Allison found, "there were several intelligences down there ... and these worked independently of one another." He tried to obtain surveillance reports from Fresh Breeze road watch teams in Laos, but "Apparently it was so classified that they couldn't give it to us although I sometimes wondered why they were getting this information if it was not to strike it." The other USAF intelligence organizations were also reluctant to provide the latest interdiction target data, but the U.S. Army Mohawk reconnaissance unit proved highly cooperative. The Mohawk aircrews enthusiastically provided visual, infrared, and radar data to the 8th TFW, and their aircraft even remained overnight with the 8th once per week. Working informally with the Army Mohawks and the Air Force C-130 Lamplighters, 8th TFW intel was able to gather and analyze its own reconnaissance data and recommend to the Lamplighters likely places to drop flares. In some cases, those methods uncovered large truck convoys or supply caches. Of course, the wing struck the targets Seventh AF fragged, but used the possible targets derived from its own local intelligence program as backups when armed reconnaissance sorties did not find anything better to attack.[126]

Hoping to compensate for the paucity of headquarters feedback, Major Vosper's wing commander started a local program of posting daily strike photography. Vosper said that posting the photos "helped greatly. Although you couldn't always tell what the extent of the damage was, at least you had something and you had something for the crews to

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[126] Allison, OHI tape.

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see and usually they'd either done a good job or they hadn't, but as far as getting the BDA out of Seventh [AF], it was a continual problem that I don't feel was ever resolved."[127] Units acted as if headquarters knew what the bombing results were, but was merely sluggish about sharing its insights with field units. Later chapters will show that headquarters did not necessarily have clearer answers about bombing results.

Unit intel staffs considered their local improvisations to extract BDA from strike photos, gun camera film, and other sources to be stop gap measures. They advocated a more centralized and better integrated analysis system for the overall campaign. Lieutenant Colonel Allison disliked the disparate intelligence structure he encountered at Seventh AF Headquarters. Major Vosper felt that the existing analysis methods were missing many small, but important pieces of information, and called for "one central point to put everything together for bomb damage assessment and for your total analysis."[128] He envisioned a place – not necessarily at headquarters - where recon photos, strike photos, OPREPs, and all other bombing data could be assembled and interpreted.

Flying unit intel officers wanted more headquarters guidance and feedback in some areas, but less in others. They specifically criticized the headquarters-mandated requirement to maintain target folders for practically any target against which their unit could be fragged. Major Vosper said when he first arrived in Southeast Asia in early 1967, his wing had to maintain about 1500 folders containing BDA reports, photos, and chronologies telling when each target had been bombed. Unit intel agreed such a

[127] Vosper, OHI tape.
[128] Vosper, OHI tape.

comprehensive database needed to be kept somewhere – presumably at headquarters - but advocated reducing to more manageable proportions the burden imposed upon each wing. Ensuring each folder contained the latest post strike photos was not easy when units had so much trouble obtaining such imagery from headquarters. Lieutenant Colonel Allison said, "Target folders in a day-to-day war ... are a luxury we cannot afford" because they are so time consuming to build and maintain.[129] Vosper was less pessimistic. He noted his wing was able to gain approval to cut the number of folders down to about 1000 by the time he left Southeast Asia in 1968, but he had additional recommendations.

Major Vosper's recommendations revealed something about how flying units perceived their bombing assessment roles. Instead of having each unit duplicate the entire target folder library, Vosper advocated allocating target responsibilities among the various wings by subdividing route packages into even smaller zones of responsibility and ensuring the unit responsible for maintaining a particular folder would be the only one fragged to strike that target.[130] That idea was consistent with the Red River Rats Informal Conference's suggestion that wings specialize in small geographic areas rather than trying to cover all possible areas. Vosper's wing, the 388th, participated in that conference. Flying units' willingness to adopt a narrowly focused theater perspective rather than a broader view seemed to be a prevalent characteristic and may have affected in some subtle way their judgments about campaign effectiveness. If headquarters staffs were not

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[129] Allison, OHI tape.
[130] Vosper, OHI tape.

meeting the units' expectations for guidance and information, the units might try to

manage and evaluate their own little corners of the air war, at least under some conditions.

Headquarters assigned identifying numbers to each target to simplify

communication, but a penchant for proliferating and changing target numbering systems

was another irritant to flying unit intel staffs. Frag orders would typically designate

important JSC numbered targets in a standardized way, but headquarters devised separate

numbering systems for SAM sites, interdiction points, and other less permanent locations.

Major Vosper complained that SAM sites were numbered three different ways – one by

DIA, another by PACAF, and a third way by Seventh AF.[131] Lieutenant Taylor recalled a

case in which Seventh AF changed the numbering of some targets listed on the frag, but

his unit did not receive the new listing for a week. Meanwhile, the wing intel officers had

to request the encoded daily target assignments over the telephone and then decode them.

Deciphering the target assignments was confusing and wasted time. Reporting target

damage may also have been confusing because headquarters might ascribe the reported

damage to a target other than the one that had actually been struck.

When judging Rolling Thunder's effectiveness, flying units used a wide variety of

indicators and methods, but emphasized first order issues. Rather than defining objectives

or strategy, they sought the best ways to carry out assigned missions and determine

immediate results. Aircrews and intel held some opposing opinions, but a cooperative

spirit prevailed. Tensions within flying units did not seriously interfere with bombing

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[131] Vosper, OHI tape.

assessment, but tensions between flying units and headquarters were more serious.

Combat units complained about both insufficient and excessive headquarters involvement

in assessment activities, contributing to an "us versus them" feeling. Units struggled to

obtain prompt bombing results feedback from headquarters, but often did not receive

acceptable support. Increasingly stringent reporting requirements combined with

unsatisfactory responsiveness to unit requests amplified the problem. Some units

responded by trying to make themselves as independent as possible of BDA from Seventh

AF. Conversely, some flyers suspected headquarters officials were more interested in

monitoring for procedural violations rather than helping units assess bombing results.

CHAPTER 4 – HEADQUARTERS BOMBING ASSESSMENT: METHODS

Senior military and civilian officials judged bombing effectiveness somewhat differently than flying unit personnel. Further removed from combat, they could ideally take a broader view, emphasizing second and third order effects. The military objectives sought presumably shaped their analytical approach, but other factors also influenced them. Headquarters staffs at Seventh AF in South Vietnam, PACAF and PACOM in Hawaii, and the JCS in Washington, DC were the military agencies responsible for interpreting data gathered by flying units. Bombing information tended to flow up the hierarchy from Seventh AF to PACAF / PACOM, and then to the JCS, but conclusions drawn from the data moved in both directions. President Johnson made the key decisions about the campaign, but Secretary of Defense McNamara heavily influenced his choices.

McNamara was fully cognizant of the need to assess military results, and his views presumably influenced the way the Air Force collected and interpreted Rolling Thunder data. The Secretary said in his memoirs,

> I insisted that we try to measure progress. … I had gone by the rule that it is not enough to conceive of an objective and a plan to carry it out; you must monitor the plan to determine whether you are achieving the objective. If you discover you are not, you either revise the plan or change the objective. I was convinced that, while we might not be able to track something as unambiguous as a front line, we could find variables that would indicate our success or failure. So we measured the targets

destroyed in the North, the traffic down the Ho Chi Minh Trail, the number
of captives, the weapons seized, the enemy body count, and so on.[1]

Military officials agreed in principle with McNamara's sentiments, but disagreed

with him about exactly how to evaluate the campaign. The interactive struggle between

each side's opposing views was a dominant influence on efforts to assess bombing results.

Rolling Thunder was primarily an interdiction effort, but progress assessments

integrated data from fixed target and armed reconnaissance missions. Various

organizations used overlapping methods to evaluate the two mission types. Judgments

about fixed target results typically began with first order effects such as observable

physical damage as reported by flying units. Determining whether or not a factory or

power plant had been damaged was relatively easy, but ascertaining second or third order

consequences such as how the damage harmed the enemy's overall war effort, hampered

infiltration, or encouraged negotiations left much more room for interpretation. Armed

reconnaissance effectiveness measurement also began with visible damage inflicted, but

then extended to second order results such as how individual strikes supported interdiction

and imposed costs on the enemy. Like fixed target results, interdiction effectiveness was

subject to multiple interpretations. Many conflicting opinions grew out of attempts to

extrapolate how visible damage influenced the will and ability of North Vietnamese leaders

to persevere. That type of analysis was of peripheral concern to flying units, but central to

headquarters staffs and senior civilian officials.

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[1] Robert S. McNamara with Brian VanDenMark, In Retrospect: The Tragedy and Lessons of Vietnam, (New York: Times Books, 1995), pp. 237-238.

This chapter and the following four chapters cover different aspects of headquarters bombing assessment. This chapter will describe the methods Seventh AF, PACAF / PACOM, JCS, and some national intelligence agencies used to gather, process, and report bombing effectiveness information. To simplify terminology, the term "headquarters" will refer to both military and civilian organizations that controlled and evaluated Rolling Thunder. The discussion will emphasize operating procedures and reporting methods, but will also include criteria used to gauge effectiveness. Strict segregation between procedures used at different levels of command is impractical, but each level displayed its own style. Methods and operating styles influenced how organizations interpreted data.

Chapters 5, 6, 7, and 8 will place less emphasis on methods, but will instead present topically organized descriptions of the criteria by which senior officials measured Rolling Thunder's success. Criteria overlap and are not mutually exclusive, but will be divided into groups labeled "basic," "systems-oriented," "preventive and defensive," and "third order." The chapters will address effectiveness criteria in an approximate, but not rigid, progression from first through third order.

Examining assessment methods from both organizational and topical perspectives shows that senior military and civilian leaders used diverse and sophisticated techniques. Most of their findings were logical, yet the two groups held incompatible views that hindered efforts to achieve a consensus about how best to judge results. Military commanders viewed bombing primarily as a way to reduce Hanoi's physical capacity for war while civilian officials envisioned it mostly as a way to erode the North's will to

continue fighting in the South. Military and civilian officials sometimes appropriated each other's rhetoric, but their basically conflicting conceptions about how to achieve national goals through and recognize effective bombing engendered bitter civil-military disagreements that dwarfed the assessment disputes found within military organizations.

Second Air Division / Seventh Air Force

When Rolling Thunder began, an organization called 2nd Air Division (AD) was the next command echelon above the Air Force combat wings in the theater. As additional air units kept deploying to Southeast Asia, the Air Force Chief of Staff, General John McConnell, convinced the other service chiefs to upgrade the air division to the more prestigious numbered air force status. On April 1, 1966, 2nd AD was therefore redesignated Seventh Air Force. Unless explicitly referring to 2nd AD, this discussion will refer to that administrative entity as Seventh AF. Major General Joseph H. Moore commanded 2nd AD and then Seventh AF from Rolling Thunder's beginning until July 1, 1966 when General William Momyer succeeded him as commander until August 1, 1968.

The headquarters coordinated USAF activities throughout the war zone in North Vietnam, South Vietnam, and Laos, so Rolling Thunder was only one of its manifold responsibilities. Operations in South Vietnam and Laos lie beyond the scope of this discussion, but providing air support to U.S. ground forces in South Vietnam was the organization's highest priority. Rolling Thunder was a secondary priority. Second AD and Seventh AF reported to different bosses depending on the route package within which bombing took place. They reported to the Commander-in-Chief of MACV (U.S. Army

General William Westmoreland during most of Rolling Thunder) for Route Package 1

operations, but to PACAF / PACOM for operations in the rest of North Vietnam. The

Navy's Carrier Task Force 77 usually administered armed reconnaissance in RPs 2, 3, and

4, leaving RPs 5 and 6A under 2nd AD / Seventh AF control. The headquarters played a

pivotal role in gauging Rolling Thunder's effectiveness and used that information to make

day-to-day decisions about how to conduct the Air Force's share of the campaign.

Several aspects of the headquarters' organization, data collection, analysis, and decision-

making procedures impinged upon bombing assessment.

Almost immediately after 2nd AD became Seventh AF, a perceived need for

upgraded bombing assessment and planning methods contributed to further organizational

changes. Accurate, continuous feedback of bombing results was essential to planning and

controlling ongoing air strikes, but as Rolling Thunder had progressed through its first

year or so the headquarters had perceived that the integration between intelligence and

operations needed improvement. The delicate aircrew - intel relationship prevalent in

flying units had an analogue within the headquarters staff. Excessive

compartmentalization between operations and intelligence activities was degrading daily

bombing assessment and planning efforts. To promote better staff coordination during

frag order preparation, one of Seventh AF's early organizational refinements was to create

two combined operations/intel teams on April 6, 1966. The Alpha team handled Route

Packages 5 and 6A (along with northern Laos) while the Bravo team specialized in Route

Package 1 and adjacent portions of Laos. The split reflected Seventh AF's divided

responsibilities to PACOM for bombing in the northern RPs and MACV for RP 1

activities. Seventh AF also hoped the mixed operations/intel teams would facilitate

quicker responses to any time-critical target information intel might obtain.

The Alpha and Bravo team members needed to develop a good working rapport

between their operations and intel members because their jobs required a relentless cycle

of simultaneously assessing yesterday's results, monitoring today's missions, and planning

tomorrow's frag. Planners spent considerable time "assessing what had happened the day

before, based on OPREP-4 reports, visual reconnaissance, and photo reconnaissance and

other sources that we were able to tap into."[2] Those past results needed to be integrated

with the present day's activities to produce a credible plan for the next day's frag orders.

Most participants deemed the team arrangements an improvement over earlier

procedures provided that certain precautions were observed. Lieutenant Colonel David

Blackbird supported the operations/intel team concept, but thought proper bombing

assessment required intel team members to be administratively independent enough of

their operations peers to retain a sense of impartiality. Intel should work with operations,

not for operations. As Blackbird explained,

> The intelligence analyst … is stuck with the job of assessing the impact of
> strike operations upon targets and translating that into terms of estimates
> or judgments about the effectiveness of the strike operations. The man
> who is laying the force on, the decision maker, since he is not the
> commander but rather is an operational person at a relatively low level, is
> always convinced, by his very nature, that he has done the right thing. The
> intelligence man, in order to be objective, even though he is tied up with a
> decision, is able to maintain a sufficient objectivity to say, 'No, we haven't
> beat the enemy yet.' We saw some examples of this in statistics keeping by
> the operational personnel. Sometimes, by tortuous reasoning, various

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[2] Lt. Col. David P. Blackbird, OHI transcript, Nov. 6, 1969, K239.0512-302, in USAF Collection, AFHRA, p. 22.

teams were able to win their war several times over and yet, the enemy didn't give up.[3]

As with flying units, formal bureaucratic procedures did not fully explain how the Alpha and Bravo teams functioned. Informal arrangements were often required to make the teams more responsive to new information. Lieutenant Colonel Blackbird explained that when the 13th Reconnaissance Technical Squadron (13th Recce Tech) analysts at Seventh AF found photographic information warranting prompt air strikes, they often short-circuited the normal Alpha or Bravo team structure by reporting the information directly to the intel members of the appropriate team. The people who were by-passed objected to such unorthodox staff procedures, but Blackbird thought, "if you're going to act very rapidly on information that is of a reasonably perishable nature, you simply have to work out some system for conveying information of strike significance directly to those who can do something about it."[4]

Frag orders included both strike and reconnaissance missions, but achieving the desired integration between both functions required additional informal improvisations. When the Alpha and Bravo teams learned that submitting recce requests through normal channels often resulted in long delays, they began working directly with the people who wrote the reconnaissance frag orders. Lieutenant Colonel Blackbird admitted, "Of course, this was illegal in terms of the way the system was supposed to operate," but the method did seem to provide more timely feedback about bombing results.[5]

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[3] Blackbird, OHI transcript, p. 57.
[4] Blackbird, OHI transcript, p. 41.
[5] Blackbird, OHI transcript, p. 51.

Decisions about the relative geographic locations of recce units and intel units was another Seventh AF bureaucratic issue that influenced bombing assessment. The alternatives were to centralize them in one place or disperse them among different bases. Initially, recce and analysis activities were concentrated at Seventh AF Headquarters, but some geographic dispersal followed later. General Momyer favored centralized command and control, but the choice involved trade offs. Concentrating both functions at Seventh AF headquarters might give the commander quicker access to bombing information, but at the cost of slower data dissemination to flying units. Major Richard Clement, a staff officer at both 7th AF and PACAF, explained that centralized reconnaissance was "great, but the fighter pilots don't get the pictures, and the purpose of taking recce is to get the commander the pictures and the fighter pilots the pictures; and if you centralize recce, they all go home to their base and nobody ever sees the damn picture."[6]

The proper basing of bombing and reconnaissance units was a closely related issue. Some flying wings contained only recce squadrons, but others were composite organizations with co-located fighter and reconnaissance squadrons. Each arrangement offered advantages. Major Clement noted, "The advantage of having a recce outfit at Tan Son Nhut [Seventh AF Headquarters near Saigon] – of course, you had the pictures available for the commander [Gen. Momyer]," but fighter pilots had problems getting the pictures. Conversely, Clement thought the composite wings "worked very, very well where you had photo processing, you had the recce unit and you had the fighter unit on

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[6] Maj. Richard B. Clement, OHI transcript, Apr. 1, 1970, K239.0512-254, in USAF Collection, AFHRA, p. 91. (Same person as Capt. Richard B. Clement).

the same base" so pilots could easily obtain the photos. Seventh AF never seemed to resolve the question completely, but leaned towards the centralized structure. Pacific Air Forces also preferred centralization and that headquarters influenced Seventh AF organizational decisions. Major Clement suspected resource limitations also predisposed Seventh AF to adopt a mostly centralized recce system because the relative scarcity of reconnaissance planes, photo processing equipment, and especially trained photo interpreters made centralized control more efficient than the alternative.[7]

Bureaucratic arrangements merely provided the structure within which the headquarters performed its assessment and planning roles. The first assessment function was to collect data. Seventh AF commanders expressed overall satisfaction with the quantity of reconnaissance data that was available to them. General Moore said, "I don't recall any inhibitions on our reconnaissance," and the author has not found any cases where General Momyer complained about insufficient reconnaissance either. Brigadier General (then Colonel) Dale Sweat was Director of Combat Operations from July 1967 to the end of Rolling Thunder. He was very satisfied with Seventh AF's photo reconnaissance coverage and noted, "We completely covered the targets … We had detailed coverage of their whole operation. So we could plan missions based on that intelligence that was kept pretty well up to date on a daily basis."[8] Most Seventh AF debates about bombing assessment procedures involved the optimum techniques to be used when procuring and processing the vast numbers of reports, photos, and other data.

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[7] Clement, OHI transcript, Apr. 1, 1970, pp. 90-93.

Figuring out which data to collect and how best to obtain it was a challenge

Seventh AF met with a combination of aircrew observations and aerial photography.

General Momyer held FACs in high regard because they became very familiar with their

assigned southern panhandle operating areas and "uncovered many targets of opportunity"

strike pilots seldom saw. A FAC who thought he saw a target typically called in an

immediate air strike, but he might alternatively request low altitude photo reconnaissance

of the suspicious location. If he called in a strike, he could simply watch what happened

during the attack. When FACs chose photo reconnaissance, photo interpreters scrutinized

the imagery for possible targets. General Momyer explained that when the pictures

revealed targets, Seventh AF would dispatch fighters and a FAC would lead them to the

area and "circle above the target to see the results." If the attack blew off camouflage or

otherwise revealed more targets, the FAC could call in additional fighters that might be

diverted from other missions.[9]

General Momyer saw advantages in having multiple sources and types of

photography. The RF-101 handled most target photography in 1965 and 1966, but the

RF-4 began taking over in 1967. Momyer said unmanned Q-34 drones were another

"basic source of information" and "produced outstanding photographs." He thought both

manned and unmanned vehicles had strengths and weaknesses. Drones flew at either high

or low altitudes, but their low altitude flights were especially valuable during marginal

[8] Gen. Dale S. Sweat, OHI transcript, Feb. 15, 1984, K239.0512-1572, in USAF Collection, AFHRA, p. 77.
[9] Gen. William W. Momyer, Air Power in Three Wars, (Washington, D.C.: Department of the Air Force, 1978), p. 218.

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weather that kept out RF-4s and "produced details not provided from the medium altitude coverage of the RF-101s and RF-4s." However, while the drone's low altitude photos showed close-up details, those images lacked wide area coverage. Momyer found that medium altitude drone flights "provided point and adjacent area coverage of immediate value in making decisions for restrike." Another drone disadvantage was that they flew programmed paths and were inflexible once launched, whereas manned aircraft were more adaptable to mission changes. Momyer concluded, "a combination of the manned and unmanned sources provided us the best view of the effects of the bombing campaign."[10]

A manned aircraft's flexibility raised additional questions about the best reconnaissance tactics – particularly how many planes to send. Momyer said Seventh AF tried both single aircraft "lone wolf" and two-aircraft methods. He explained that lone wolf advocates felt a "reconnaissance pilot lived by his wits in out-foxing the enemy and he did so easier with a single aircraft" because one plane was harder to detect and had maximum maneuvering flexibility when avoiding defenses. Two-aircraft advocates countered that the wingman could watch for enemy defenses, allowing the leader to concentrate on photography. A second plane also provided backup in case of camera troubles, increasing the odds of mission success. General Momyer did not consider the lone wolf versus two-plane debate to have been resolved during Rolling Thunder.[11]

Momyer thought that deciding exactly when to schedule reconnaissance also involved tradeoffs, but "The best technique was to schedule the reconnaissance aircraft

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[10] Momyer, Air Power in Three Wars, p. 233.
[11] Momyer, Air Power in Three Wars, p. 234.

into the target as close as possible to the strike aircraft to take advantage of the shock of the attack and of its ECM and fighter protection." That technique protected the recon planes, but smoke and dust often obscured the target. Waiting until the smoke cleared negated ECM and fighter support, but might yield clearer pictures. As a compromise, Momyer favored recon planes making photo runs close to, but independent of, the strike force rather than being mixed in with it. However, "If we had high level interest in the results of a specific strike, the reconnaissance flight followed the strike flight within five to seven minutes. This timing provided fairly good protection for the reconnaissance aircraft and reasonable target coverage if the wind was right."[12] As mentioned in Chapter 3, RF-4 pilots like Maj. Hines understood those timing considerations, but wanted to keep their flights as unpredictable as possible.

Intel staff members also commented about preferred Seventh AF target photography methods. Target planner Lt. Col. William Greenhalgh judged photography most effective if flown soon after strikes – preferably on the same day and before any damage repair work had begun. He reckoned that same day post strike photos meant intel would know by that night whether the target required a restrike, but weather or other factors often upset that time schedule. Like the recce pilots, Greenhalgh preferred day reconnaissance to night photography because he knew the photo flash bombs used for illumination exposed recce planes to antiaircraft fire. He did not refer to less obtrusive night photographic techniques such as the use of infrared film and seemed mostly

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[12] Momyer, Air Power in Three Wars, p. 234.

interested in conventional visual images. A couple months after transferring from PACAF

headquarters to Seventh AF headquarters, Capt. Richard Clement remarked that "We

wanted recce in there five to seven minutes after the strike to get current pictures."[13]

The headquarters chose to de-emphasize some kinds of information. Chapter 3

told how flying units rarely mentioned enemy casualties. A similar practice prevailed at

Seventh AF, but a few exceptions did occur. Deputy Chief of Staff for Intelligence Brig.

Gen. Jammie Philpott reported how Operation Neutralize, an intense 1967 bombing effort

just north of the DMZ to eliminate enemy artillery sites threatening U.S. ground positions,

had destroyed or damaged 69 artillery positions, caused 420 secondary explosions, and

inflicted "an estimated 3000 enemy casualties."[14] American ground forces did not enter

North Vietnam to verify those results so the source of Philpott's casualty figures is

unclear, but the closer aircraft bombed to U.S. ground troops, the more likely Seventh AF

was to report body counts.

The OPREP-4s and aerial photos were staple Seventh AF data sources, but the

staff acknowledged both had limitations. The electronically transmitted OPREP-4

messages could be received and processed quickly, but Lt. Col. Greenhalgh said

intelligence officers knew "these were highly inaccurate" at first. He said that as pilots

realized intelligence officers had alternative information sources, OPREP-4s became more

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[13] Capt. Richard B. Clement, OHI transcript, Dec. 4, 1968, K239.0512-070, in USAF Collection, AFHRA, p. 13. (Same person as Maj. Richard B. Clement).
[14] Brig. Gen. Jammie M. Philpott, End-of-Tour Report, Dec. 6, 1967, K740.131, in USAF Collection, AFHRA, p. 11.

objective.[15] Inaccurate or incomplete OPREP-4 messages did not necessarily reflect poorly upon pilots. Intel officers understood that smoke and debris often prevented all but the first few pilots striking a target from observing the damage. Post strike reconnaissance photos revealed many details, but usually took much longer than OPREP-4s to be interpreted and to work their way through channels. However, Seventh AF believed strike recorder cameras installed on aircraft compensated for limited pilot visual observations, helped reduce inaccurate OPREP-4 reports, and were quickly available. Relatively few planes were equipped to take strike photos at first, but such pictures became more widely available as Rolling Thunder continued. When units processed their own strike camera images they could often see where their bombs had hit in time to include that information in OPREP-4s. Post strike photos taken after the smoke had cleared could reveal additional information not discernible on strike photos.

Even if the OPREP-4s were accurate, Seventh AF procedures for interpreting them induced errors. Lieutenant Colonel Blackbird said from four to six officers reviewed all the OPREP-4s the headquarters received each day. Those officers compiled statistics and drew preliminary conclusions about results, but, "since human beings are imperfect, the data were always slightly different, primarily because of poor addition and subtraction in many cases. There were always several sets of data running around and occasionally arguments broke out or disagreements broke out over somebody's data."[16] He did not list the statistics compiled, but numbers of trucks destroyed, bridges damaged, and related

[15] Lt. Col. William H. Greenhalgh, OHI transcript, Oct. 11, 1967, K239.0512-40, in USAF Collection, AFHRA, p. 23.

parameters were presumably what he had in mind. If so, then trends seen in such first

order statistics could have given the staff clues about second order effects such as

interdiction. Blackbird made special arrangements to ensure the official BDA records

reflected the statistics his office had approved.

Photo analysis shortcomings also limited the amount of information Seventh AF

could extract from imagery. General Joseph Moore, 2nd AD and Seventh AF Commander

from 1964 to 1966, characterized the quantities of reconnaissance planes, photo

processing equipment, and photo interpreters as "quite meager" during Rolling Thunder's

early days.[17] General Gilbert Meyers, who was Moore's Vice Commander from 1965 to

1966, said his headquarters had "a tremendous problem in processing the film that we

could take. … our picture taking capability far surpassed our interpretation capability" so

"it's the processing that becomes the real bottleneck … the processing of the intelligence

data." He estimated "we probably got on the order of maybe 20 percent of the

intelligence available on each photo that was taken because of lack of photo

interpreters."[18] Meyers doubted the Air Force could ever train enough photo interpreters

so he proposed programming computers to scan images and decide which ones warranted

closer human scrutiny. He also thought too many people demanded an "instantaneous

read-out capability" which needlessly burdened photo analysts. Some reconnaissance

planes had real time readout capabilities, but the general insisted, "they are used for very

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[16] Blackbird, OHI transcript, p. 33.
[17] Lt. Gen. Joseph H. Moore, OHI transcript, Nov. 22, 1969, K239.0512- 241, in USAF Collection, AFHRA, p. 57.

specialized purposes, looking for a very specialized kind of target. But if you try to

generate this sort of thing [instant imagery readout] across the board, I think you are

going to overly complex your system, and you will never get anything out of it." Meyers

agreed quick response was needed when photos depicted mobile targets, but "a lot of the

targets that you see are not mobile targets to start with, so you don't really have to take

immediate action to destroy them."[19] Better choices about which photos merited rapid

interpretation would rationalize the intel system and relieve the work overload.

Procedural changes within the headquarters may have exacerbated some photo

interpretation difficulties. The 13th Recce Tech Squadron handled Seventh AF target

analysis. According to Lt. Col. Blackbird, the 13th's photo analysts were initially

organized geographically, meaning that analysts specialized in certain regions and

integrated all available information sources to monitor targets within their assigned

territories. Later, the 13th reorganized on a functional basis whereby specific analysts

handled photography for the whole theater while others specialized in other data sources

such as intercepted electronic signals. Blackbird judged the functional method inferior to

the geographic one because functional analysts "were not as knowledgeable about all

those sources of information relevant to a particular target or target area." He stated that

confusion and errors increased after the reorganization, and Recce Tech sometimes even

nominated "new" targets they had already nominated before. The experience convinced

Blackbird that "the people engaged particularly in photo exploitation simply must have

[18] Gen. Gilbert Meyers, OHI transcript, May 27, 1970, K239.0512-282, in USAF Collection, AFHRA, pp. 87-88 and 138.

contact with all of the information in their particular area, including the strike

operations."[20] In effect, Blackbird thought dividing enemy territory into sections similar

to route packages would permit better analyses than having analysts specialize in discrete,

functional information sources for all targets throughout enemy territory.

Some Seventh AF bombing assessment methods were less centralized than the

OPREP-4 or Recce Tech procedures. Lieutenant Colonel Richard Alexander commanded

the 600th Photographic Squadron from 1967 to 1968 and supported Seventh AF by

handling USAF strike photography and gun camera film throughout Southeast Asia. His

unit did not deal with pre strike or post strike reconnaissance imagery, however.

Although the 600th Photo Squadron commander was administratively located at Seventh

AF headquarters, separate detachments were assigned to Air Force units throughout the

region, including fighter wings. Alexander deemed his squadron highly effective in

supporting the fighter wings' strike photography needs. He said General Momyer had set

the goal of obtaining a 94% equipment reliability rate for strike cameras, but Alexander

boasted of a 98% effectiveness rate meaning, "our [strike camera] systems ran and we got

pictures and they … had readable information on them." He acknowledged image quality

was not always good, but noted; "Intelligence people can accept rather meager imagery

sometimes" and still derive valid BDA.[21] Alexander's camera reliability percentages sound

unusually high compared to what tactical recce wing members such as Lt. Taylor deemed

[19] Meyers, OHI transcript, pp. 96 and 91.
[20] Blackbird, OHI transcript, pp. 19-20.
[21] Lt. Col. Richard L. Alexander, OHI tape, Nov. 22, 1968, K239.0512-089, in USAF Collection, AFHRA. (The transcript will not be cited because it only paraphrases Alexander's words.)

plausible, but Alexander and Taylor were applying the same effectiveness metric to judge

camera system performance. Taylor deemed official RF-4 camera reliability figures of

95% or better greatly exaggerated.[22]

Once the various staff agencies had gathered and processed OPREP-4s, photos,

and other data, a key subsequent step was to organize the information into a useful format

for planning and decision-making. Maintaining a current target status database was an

important function. Lieutenant Colonel William H. Greenhalgh, Jr. developed Seventh AF

target planning materials from August 1966 to August 1967 and helped create a Central

Target Folder Library (CTFL) containing about 3500 folders kept current at all times. By

January 1967, the library had complete coverage of every target in North Vietnam and

Greenhalgh was proud to say that the library could promptly provide commanders or staff

members any folder on demand. The folders contained results from OPREP-4s and photo

interpreters' reports and showed when each target had been fragged, struck, and observed

by reconnaissance. The staff retired folders for destroyed or inactive targets and created

folders on unapproved targets just in case they were later cleared for strikes. Significantly,

the CTFL included Navy targets and Lt. Col. Greenhalgh asserted interservice cooperation

was good with "a complete back and forth flow" of information.[23] Overall, he judged the

target materials adequate for supporting flying units.

Greenhalgh deemed target folder libraries valuable for headquarters use, but was

not sure how much flying units would benefit from them. He knew that field units were

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[22] Lt. Lawrence M. Taylor, OHI tape, n.d. (circa 1970), K239.0512-329, in USAF Collection, AFHRA.
[23] Greenhalgh, OHI transcript, p. 13.

establishing their own libraries, but did not believe the concept's full benefits reached

them. Keeping folders current with the latest strike photos was a common flying unit

problem. Greenhalgh thought the F-105 strike recorder camera should have been able to

show squadron intel officers within 10 minutes after landing whether the bombs were on

target and therefore "whether the mission was successful," but thought some squadron

intelligence officers were lax about keeping their folders updated with the latest strike

photos.[24] He did not comment about the post strike recce photos that units complained

were slow to trickle down to the squadron level. Chapter 3 showed that flying unit intel

officers also doubted the viability of each unit having a target folder collection, but not

because their people were lax. Lieutenant Colonel Allison of the 8th TFW called the

folders "a luxury we cannot afford" because building and maintaining them took too much

time.[25] Major Vosper of the 388th TFW also thought Seventh AF's prescribed target

folder procedures needed revision.[26]

The headquarters also strove to track all sorties flown and bombs dropped, but

accounting for them was complex and required some arbitrary choices. Since Seventh AF

needed to account separately for sorties flown, ordnance expended, and targets attacked in

each Southeast Asia operating area, the headquarters arbitrarily decided that the place a

sortie first dropped "hard ordnance" (bombs as opposed to rockets or gunfire) was where

that sortie counted.[27] Major Richard Clement gave the hypothetical example of a plane

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[24] Greenhalgh, OHI transcript, pp. 2-3.
[25] Lt. Col. Clark H. Allison, OHI tape, n.d. (circa 1970), K239.0512-298, in USAF Collection, AFHRA.
[26] Maj. Frederick J. Vosper, OHI tape, n.d. (circa 1970), K239.0512-330, in USAF Collection, AFHRA.
[27] Clement, OHI transcript, Apr. 1, 1970, p. 68.

that bombed a Route Package 1 target then fired rockets at trucks in Laos while returning to base. That sortie would count only as a RP 1 sortie – it would not count as a sortie to Laos, so the sortie count for Laos would be one lower than the actual number of planes that had made attacks there. However, when intel staff members briefed General Momyer about BDA, they counted target damage in all the places where damage had occurred. For the hypothetical example, the intel analysts would report the results both for the RP1 bombing and the rocket attack against the trucks in Laos. Momyer understood that the sortie counts and BDA statistics were based on different assumptions. As Major Clement explained, "your figures never did jive and you understood why because you're counting one airplane who may have struck at two or three areas from the air view and from the ground view you're just counting airframes overhead. ... it was agreed this is the only real way to do the thing: when you're counting airplanes, count where it first dropped bombs; when you're counting BDA and whatnot, you count from the ground up."[28]

The sortie and BDA counting procedures might have yielded some anomalous statistics. Areas with few countable sorties might have sustained proportionally more reportable BDA, creating the appearance of more damage inflicted per sortie. Alternatively, BDA per sortie in other areas might have appeared artificially depressed if sorties expended only part of their ordnance before moving on to attack targets in other areas. Bombs (hard ordnance) would usually be the first ordnance expended because pilots preferred to lighten their aircraft prior to performing gun or rocket attacks and

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[28] Clement, OHI transcript, Apr. 1, 1970, pp. 68-72.

strafing with full bomb loads would have made the planes heavier, slower, and less

maneuverable. One overall consequence of Seventh AF's counting procedures may have

been to reduce the number of countable sorties in Laos. Air Force planes striking RP 1

targets with bombs would seem more likely to have conducted armed reconnaissance in

Laos while returning to bases in Thailand than to have entered the Navy-controlled RPs 2,

3, or 4. Sorties returning from RPs 5 or 6 might sometimes have dropped into RP 1 for

rocket or strafing attacks on the way home, but again, Laos would have been a more likely

place to perform armed reconnaissance if the planes were returning to bases in Thailand.

Organizing sortie and bomb damage statistics so that commanders could use them when

making decisions was a convoluted and somewhat arbitrary process.

Seventh AF decision-making based on bombing results did not all happen at the

headquarters level. Strike camera capabilities removed some decisions from the

headquarters' purview and pushed them down to flying units. The 600th Photo

Squadron's Lt. Col. Alexander thought field units' prompt access to post strike imagery

was "a spectacular breakthrough in the use of photography" because fighter wing

commanders and their staffs "were making decisions that they in the past had always had

to make much later by virtue of post strike reconnaissance." Alexander noted wing

commanders could view strike photos within an hour after their planes had landed and

"determine success or failure in striking the target. Thus, they were able not only to

decide rather quickly whether or not they had to restrike, but they were able to also decide

that they didn't even need recce."[29] The strike photos therefore decentralized BDA,

presumably lightening Seventh AF's reconnaissance and decision-making workload.

Large bureaucracies might ordinarily arrogate to themselves as much decision-

making authority as possible, but Seventh AF had reasons to allow subordinate units to

make some decisions locally based on strike photos. General Momyer complained that

Washington's policies interfered with Seventh AF efforts to extract useful information

from post strike recce imagery because, "Throughout the war there was unusual interest in

having photographs of the day's strikes in Washington. High level interest in each

bombing mission resulted in photographs being flown back to Washington on scheduled

courier flights before field agencies had fully interpreted strike results. This procedure led

to considerable difference of opinion about strike results, differences which had to be

ironed out before the next list of targets was released." As more fighters began carrying

strike cameras, Gen. Momyer reiterated some of Lt. Col. Alexander's remarks about how

those photos helped field units judge strike results more promptly. Momyer felt squadron

and wing strike photo interpretation helped offset some of Washington's targeting

limitations because, "A quick examination of the developed [strike camera] print

determined the general level of damage or lack of damage to the target without our having

to wait for results of the reconnaissance mission. ... each unit ... had an invaluable asset

when priority targets were subject to withdrawal [by Washington] if we did not destroy

them within a particular time limit."[30] Momyer was referring to the times when the

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[29] Alexander, OHI tape, Nov. 22, 1968.
[30] Momyer, Air Power in Three Wars, pp. 233-234.

President's target approvals expired unless targets were destroyed within a specified time and with a limited number of sorties. Quicker BDA readouts at the unit level increased the odds of destroying targets before approvals expired. Chapter 5 will describe target approval procedures in more detail.

Despite flying units' use of strike cameras, heavy decision-making burdens still fell on Seventh AF. Although the Alpha and Bravo operations/intel teams conferred advantages, they did not defuse staff tensions entirely because the nature of the intel analysts' job seemed to entail clashes with the operations planners no matter how well the teams appeared to be functioning. Intel officers such as Lt. Col. Blackbird found that in practice "the targets selected for strike were determined by the intelligence people on the team," but such a strong influence on operations "miffed some of the operational planners who had an entirely different view of how you conduct tactical war, particularly in the targeting aspect." Blackbird felt a workable arrangement evolved on the staff whereby "we did not, we intelligence people, actually make the decisions. We were there to support the people who were making the decisions." Intel officers felt they knew best what the enemy was doing and how bombing affected the enemy so intel "just couldn't escape influencing, almost in a total way, which targets were selected for strike and what kind of weight of effort went against those particular targets."[31]

However, Lt. Col. Blackbird still saw potential pitfalls in the operations/intel team working arrangements. He was especially troubled by some team members' tendency to

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[31] Blackbird, OHI transcript, pp. 21-22.

become too "source focused," by which he meant they overemphasized a single information source such as photography, thus basing the teams' decision-making on too narrow a factual basis. The phenomenon resembled the problem he described when the 13th Recce Tech Squadron reorganized its target analysts, making them specialists in single sources such as photos or signals intelligence. Blackbird said most source-focused people placed an excessive reliance on photos, and he explained that some people "simply didn't believe that a target existed unless they could see it on a photo. If you could see it on a photo, it did exist and was important almost by virtue of the fact that it was on a piece of photography." One dramatic source-focusing illustration occurred when he created dummy target materials by superimposing a picture of the Golden Gate Bridge over a picture of North Vietnam. Although the bridge was "out in the boondocks with no roads leading to it" several operational planners wanted to strike it anyway because they deemed it a "lucrative target." Blackbird insisted targets were not inherently lucrative just because they looked impressive, but felt, "this is the kind of attitude towards targeting that is unfortunately far too widespread in the Air Force today."[32]

Blackbird's idea contrasts sharply with the conceptually related phenomenon espoused by Morris Blachman, an Air Force intel officer in Vietnam. Chapter 3 told how Blachman was convinced that commanders trusted pilots' reports while photography "was consistently played down in favor of the far less accurate pilots' reports."[33] Such diametrically opposed views are hard to reconcile, but one could imagine people

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[32] Blackbird, OHI transcript, pp. 20 and 25-26.

approaching either extreme. Various commanders and staff officers presumably weighed

evidence differently, but achieving a properly balanced integration between diverse

information sources was a key to bombing assessment.

To cope with source-focused people (many of whom had pilot backgrounds),

Blackbird said Seventh AF intel planners learned to use photos selectively. For example,

"If we'd had difficulty selling a particular strike program because we had a lack of either

the convincing rationale or something, we came in with a good photo. It was only in

those cases that we'd go show a photo to an operator and say, 'Okay, what are you going

to do about that?' or some appropriate words and generally we got some action."[34]

Blackbird resorted to such manipulations, but still maintained that targets needed to be

related to objectives. He found that the most successful target analysts understood the

overall air strategy and interpreted photos within the broader context of that strategy and

all other available information.

As Seventh AF commander, General Momyer did not make every targeting

decision, but he kept his staff focused on overall strategy. One staff member recalled that

Momyer often selected the next day's targets at an afternoon staff meeting and that

decisions were "based in some cases upon early pilot reports of what they had done that

afternoon."[35] Those pilot reports were presumably OPREP-4s the headquarters received

shortly after each strike mission had landed, but Momyer was privy to diverse information

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[33] Morris J. Blachman, "The Stupidity of Intelligence," in Charles Peters and Timothy J. Adams, eds., Inside the System, (New York: Praeger, 1970), p. 272
[34] Blackbird, OHI transcript, pp. 41-42.
[35] Clement, OHI transcript, Apr. 1, 1970, p. 15.

sources, and used them in different ways. As an operational air commander, he occupied

an intermediate level between combat units and higher-level authorities like PACOM and

the JCS. Momyer drew a distinction between strategic and tactical reconnaissance. He

said high-flying aircraft like the SR-71 and U-2 "provided considerable information," but,

> [T]heir information was not timely or pertinent to the targets planned for a
> particular day. Most of the information produced by these platforms was
> used by national intelligence agencies for detailed evaluation of the effects
> of air attacks on the military, political, and economic life of the country.
> Further, this intelligence analysis led to the nomination of targets to the
> JCS that the President approved and then sent to CINCPAC for strike. For
> day-to-day operations, I depended upon the tactical reconnaissance force.
> Although details on specific targets often came from national intelligence
> agencies, this information was slow in reaching the field and had little
> influence on the hourly decisions of how best to strike the targets. For the
> weekly projection of strike operations, however, national intelligence
> information was used extensively.[36]

Momyer's remark about how "national intelligence agencies" used high altitude

recce for "evaluation of the effects of air attacks on the military, political, and economic

life of the country," may have been an allusion to the joint Central Intelligence Agency /

Defense Intelligence Agency periodical reports entitled An Appraisal of the Bombing of

North Vietnam. (The abbreviated title Appraisals will also be used when referring to the

reports) A later section of this chapter will describe the Appraisals more fully, but a few

remarks are applicable now. Appraisals always divided their discussions into exactly those

three topics (military, political, and economic) and treated them in the same sequence in

which Momyer listed them. They remained secret for many years after the war, and the

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[36] Momyer, Air Power in Three Wars. pp. 232-233.

author has found no explicit proof that Momyer personally used them when making decisions, but Seventh AF was on the <u>Appraisals'</u> highly restricted distribution list.[37]

General Meyers expressed other views about using different types of aerial reconnaissance imagery for making decisions. He agreed photos of fixed targets were very valuable, but was skeptical about using advanced technologies to find armed reconnaissance targets, claiming, "we get 90 percent of our intelligence from the same old ways – from the eyeball, from the camera. And the new, exotic equipment – SLAR [side-looking airborne radar], IR [infrared], and all the rest of them – didn't produce ten percent of the intelligence that we got. All it produced was questions – meaning you've got some blips, what the hell do they mean? And nobody was able really to figure it out – no."[38]

Meyers also distinguished between the decision-making value of fixed target BDA photos and photos taken of armed recce strikes. He regarded photography of strikes against fleeting targets as a type of documentation more than a source of useful BDA information. He favored giving FACs hand-held cameras not to obtain BDA but because,

> there is always a big question, 'Well, how good are they, how effective are they? What did they really find?' Well, if you don't have the [hand-held] camera, the photograph on occasion to show it, you don't have any proof that you're really doing anything out there. But as far as I'm concerned, the camera isn't going to see much more than the eyeball is going to see. This is basically a visual reconnaissance function, and therefore you don't really need the cameras. You're not getting intelligence from the cameras; you're getting justification for [from] the cameras.[39]

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[37] CIA/DIA, <u>An Appraisal of the Bombing of North Vietnam,</u> all issues from Aug. 1966 to Oct. 1968, distribution list. (Cited hereafter as "CIA/DIA <u>Appraisal.</u>")
[38] Meyers, OHI transcript, pp. 96-97.
[39] Meyers, OHI transcript, p. 98.

Meyers' comment about using photography as "justification" implied he felt a need to defend armed reconnaissance missions against accusations they were ineffective. Such accusations came not from Seventh AF or other military headquarters, but from civilian officials such as Secretary McNamara. However, later chapters will show that McNamara criticized interdiction mostly in terms of second and third order effectiveness. Photos taken by FACs would document first order results, but would not necessarily demonstrate aerial interdiction's second or third order success or failure.

Seventh AF bombing assessment and decision-making did not occur in isolation from flying units. Chapter 3 described some complaints and doubts flying unit personnel expressed about the way Seventh AF and other headquarters were running the air war. The Seventh AF staff was sensitive to many of those concerns.

Mismatches between targets and ordnance were one common combat unit complaint. Seventh AF target planner Lt. Col. Greenhalgh acknowledged missions sometimes carried munitions inappropriate for their targets, but blamed many target-weapon mismatches on last minute target changes, squadron bomb loading errors, and occasional shortages of some munitions. He thought weaponeering – which means proper matching of ordnance to targets - was good overall. He did not refer to Maj. Buhrow's assertion that assigning experienced combat pilots to Seventh AF had reduced the frequency of mismatches.[40]

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[40] Greenhalgh, OHI transcript, p. 29. See also Maj. Robert E. Buhrow, OHI transcript, Sep. 28, 1967, K239.0512-028, in USAF Collection, AFHRA, p. 4.

Seventh AF intelligence was also cognizant of recurring pilot complaints about bombing targets that had already been destroyed, but insisted the issue was more complex than some squadron intelligence officers and aircrews may have thought. Aircrews tended to rely primarily upon visual cues when judging a target's condition, but Greenhalgh maintained that pilot visual observation was not always reliable, and he blamed squadron intelligence officers for not adequately briefing strike crews about certain target types. He explained that a bridge's condition could be especially deceptive when judged from the air. Some bridges may have looked wrecked, but other intelligence sources available to Seventh AF (but perhaps not to flying units) showed they remained in use. Greenhalgh thought underwater bridges confused pilots who did not understand the structures were serviceable even if they were barely visible. Cable bridges looked unimpressive from the air, but required attack anyway because at night the enemy rolled out bridge sections along the cables, drove vehicles across, and then retracted and hid the sections leaving nothing visible except cables across the water. Greenhalgh asserted that if squadron intelligence officers briefed their pilots adequately, crews would understand the need to accept those findings and bomb the targets however damaged they might look.[41]

Lieutenant Colonel Greenhalgh deemed railroad targets particularly hard to evaluate visually from the air. Flyers like Col. Jack Broughton and Maj. Robert Buhrow were convinced the northeast line from Hanoi to China contained nothing but "blah" targets and intense antiaircraft defenses. Buhrow was exasperated enough to state, "It

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[41] Greenhalgh, OHI transcript, pp. 30-31.

seemed like regardless of what you said, regardless of what the photos showed, they decided that we should hit Kep railroad yard."[42] Greenhalgh agreed the line was heavily defended, but considered the Kep rail yard "our best target up there" because the tracks changed from meter to standard gage, creating "a tremendous bottleneck."[43] After repeated air strikes, pilots looking at the yard might think it was totally destroyed, but Greenhalgh suspected they did not realize the North Vietnamese repaired a few tracks within hours after raids and rushed through as much rolling stock as possible. Repeated raids were necessary to destroy as many rail cars as possible before the enemy could shuttle them to a sanctuary area. Greenhalgh implied rolling stock destroyed was a better measure of success than track destruction. His opinion that aircrews did not appreciate enemy repair capabilities conflicted with Col. Olds's comments, but Greenhalgh did not substantiate Olds's bitter complaint that intelligence officers thought the Kep rail yard stayed open because pilots' bombs kept missing the tracks.[44]

Aircrews often called for a quick "non-expert evaluation" of aerial photos to be followed later with a more thorough analysis. Pilots such as Maj. Buhrow and Maj. Skogerboe did not think Seventh AF was handling photos in a timely manner, but Seventh AF did use methods such as the Immediate Photo Interpretation Report (IPIR) to extract time-sensitive data from photos and expedite those data through intel channels. Captain Alexander Dulevitz, who handled U-2 and drone imagery as Seventy AF Chief of

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[42] See Col. Jack Broughton, Thud Ridge, (Philadelphia and New York: J. B. Lippincott Co., 1969), p. 215 and Buhrow, OHI transcript, Sept. 28, 1967, pp. 8-9.
[43] Greenhalgh, OHI transcript, pp. 31-32.

Exploitation, Out-Country Reconnaissance from 1967 to 1968, indicated that IPIRs had to be submitted within 24 hours after receipt of the film.[45] Evidently, some IPIRs stayed within Seventh AF headquarters, but the operations/intel teams used them to divert sorties to potential armed reconnaissance targets and to refine frag planning. Headquarters intel officers did not appear to think flying units needed to receive all the IPIRs to perform their missions. Supplemental Photo Interpretations Reports (SUPIRs) represented more thorough evaluations of photographs and had a longer deadline. Much like their flying unit counterparts, Seventh AF intel officers felt "the most difficult job we had to do ... was to convince these people [pilots] that the latest target photography was not always the best target photography from the target acquisition standpoint."[46]

However, even Seventh AF found the 13th Recce Tech Squadron's IRIR methods too inflexible for some purposes. Chapter 3 described the Combat Skyspot ground-based radar bombing system that enabled attacks to continue against some targets despite cloudy weather. Accuracy was uncertain so Seventh AF devised the "Ground Zero Program" to calibrate the radar sites. Some planes bombed the targets under ground radar control during good weather. Planners followed the strikes with photo reconnaissance. The intent was to plot the direction and distance from the target where the radar-directed planes' bombs had actually hit. Unfortunately, the IPIRs stubbornly kept reporting only the target's condition rather than where the bombs had landed. Repeated discussions

[44] See Brig. Gen. Robin Olds, OHI transcript, 1968 (month and day unknown), K239.0512-051, in USAF Collection, AFHRA, p. 37.
[45] Capt. Alexander R. Dulevitz, OHI tape, Oct. 13, 1970, K239.0512-363, in USAF Collection, AFHRA.
[46] Blackbird, OHI transcript, p. 23.

between the staff agencies involved eventually resolved the problem and helped calibrate the radar sites, but Lt. Col. Blackbird concluded, "the kind of information we wanted from this particular photography did not fit into the usual IPIR format. They were so poured in concrete at that particular time that they were doing everything by the numbers and not thinking about responding to anything outside that didn't fall within the general grill."[47] Evidently, flying units were the only ones having problems with inflexible damage assessment procedures.

Despite their disagreements, Seventh AF intel analysts and flying unit aircrews agreed about some things when gauging bombing's results. Both agreed that political restrictions degraded Rolling Thunder's potential military utility. Lieutenant Colonel Greenhalgh thought the Air Force should have picked targets based on military objectives, but was artificially constrained to selecting those targets that were not arbitrarily prohibited. He seemed to think targeting decisions was primarily guided by restrictions and prohibitions rather than by efforts to achieve positive military objectives. The restrictions may have stifled thinking even among staff planners who therefore resigned themselves to fighting by the rules rather than fighting to win. When asked how properly to judge bombing effectiveness, Greenhalgh admitted such assessments were very hard to make and the "only criteria we could use was, did it destroy the target to the degree that we had desired." For reconnaissance, the question was, "did it find out the information about the enemy that we asked it." Many pilots would likely have agreed with both

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[47] Blackbird, OHI transcript, p. 60.

remarks. He conceded, "These are very basic measuring devices, of course, and not actually pertinent to the overall airpower effectiveness."[48]

PACAF and PACOM

Tracing the flow of bombing assessment information through the USAF hierarchy beyond Seventh AF would be relatively straightforward if a simple chain of command had existed, but command arrangements were complex. Rolling Thunder also represented a progressively smaller share of each succeeding headquarters' overall responsibilities. Seventh AF handled most day-to-day decisions about USAF operations in Southeast Asia (of which Rolling Thunder was only one part), but functioned within boundaries set by other organizations. Seventh AF usually supported General Westmoreland's Military Assistance Command Vietnam (MACV) for Route Package 1 operations, but Rolling Thunder was a secondary issue for Westmoreland who was primarily occupied with the war in the South. He wanted to interdict enemy men and equipment before they reached American forces. Since RP 1 contained very few worthwhile targets except transportation routes, Westmoreland gave the Seventh AF commander considerable leeway in deciding exactly what to bomb in that area. Seventh exercised an even freer rein in the remaining route packages that were split between Seventh AF and its Navy counterpart, Carrier Task Force 77 (CTF-77).

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[48] Greenhalgh, OHI transcript, p. 43.

The next level of command above Seventh Air Force at which Rolling Thunder

effectiveness was systematically analyzed was Pacific Air Forces (PACAF), which was the

USAF component of Admiral Sharp's multiservice Pacific Command (PACOM) in

Hawaii. Pacific Air Forces gathered bombing data from Seventh AF, analyzed it,

communicated findings to PACOM, and recommended courses of action. Pacific

Command coordinated Army, Navy, Air Force, and Marine Corps activities across a large

region. As CINCPACOM, Admiral Sharp's Rolling Thunder role was to referee Air

Force and Navy bombing operations, interpret results, report them to the JCS and

recommend policies for integrating the bombing into the overall war in Southeast Asia.

Senior PACAF officers seemed less pleased than their 2nd AD or Seventh AF

counterparts with the caliber of Rolling Thunder intelligence information their

headquarters received. General Hunter Harris was CINCPACAF until General John Ryan

succeeded him in February 1967. Both generals expressed doubts about the adequacy of

the available intelligence data. Shortly before he retired as CINCPACAF, Harris

remarked, "our photo intelligence has improved considerably," implying that the function

had needed improvement earlier. He was especially pleased about the low altitude

reconnaissance RF-101s were performing, but noted bad weather often impeded

photography. Harris alluded to "Certain other types of photography I won't go into here"

– probably because the interview was not classified secret - and said radio direction finding

also helped locate and assess the condition of targets such as enemy headquarters, but felt

that despite those improvements, "adequate intelligence is still lacking."[49] Harris

expressed somewhat more favorable sentiments during a second interview four years later

when he praised the performance of RF-101s and thought RF-4 and SR-71 aircraft had

"greatly improved reconnaissance capability."[50] Unlike his 1967 interview, the one in

1971 was classified secret and Harris recalled that reconnaissance support to PACAF was

"quite good," but he had been "most anxious to get in the most exotic types of

reconnaissance, ... IR and laser equipment, new equipment we would liked [sic] to have

had earlier. However, with the equipment that we had, I think that the units did a terrific

job and were quite responsive."[51] Interestingly, General Harris' opinion about "exotic"

sensors was almost diametrically opposed to that expressed by 2nd AD and Seventh AF

Vice Commander General Meyers who disparaged them.[52] General Ryan also

acknowledged that PACAF had had problems gathering bombing assessment information.

After he became USAF Chief of Staff, he recalled an overall scarcity of information during

Rolling Thunder, noting, "as far as intelligence – outside of photo intelligence, we didn't

have a hell of a lot. I mean, you got a little bit from the ARDF [airborne radio direction

finding], but not a great deal."[53] Although the interview was classified secret, Ryan made

no reference to other bombing assessment data sources.

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[49] Gen. Hunter Harris, OHI transcript, Feb. 8, 1967, K239.0512-377, in USAF Collection, AFHRA, p. 45.
[50] Gen. Hunter Harris, OHI transcript, Apr. 22, 1971, K239.0512-403, in USAF Collection, AFHRA, pp. 52-53.
[51] Harris, OHI transcript, Apr. 22, 1971, pp. 52-53.
[52] Meyers, OHI transcript, pp. 96-97.
[53] Gen. John D. Ryan, OHI transcript, May 20, 1971, K239.0612-476, in USAF Collection, AFHRA, p. 50.

Pacific Air Forces relayed routine reconnaissance data and operational reports both up and down the chain of command. General Ryan did not discuss his staff's ability to send reports to higher headquarters, but admitted distributing information to flying units was a weak area. He later recalled, "as far as photos we had problems within PACAF making sure that the crews had the latest information on their target ... I remember many units that I'd go into the Target Intelligence Section and tell them to give me a picture of Phuc Yen [airfield], for instance, and get a picture dated 1965, when we had pictures of '67 and '68." The general said the problem "was a matter of distribution."[54] Aircrews sometimes resented the headquarters' slowness in distributing photos or even accused headquarters of deliberately withholding the information, but Ryan blamed ordinary administrative inefficiency. Although Ryan was referring to PACAF, a share of the blame for slow photo distribution must have belonged to Seventh AF, which was the headquarters most directly in charge of aerial photography. Ryan may have been thinking of Seventh AF as a subset of PACAF, which it was.

Chapter 3 mentioned that the communication of bombing data between different organizations was initially complicated by the incompatible message formats different services were using. According to one PACAF staff officer, "reports would come up to us in Air Force format, and we would have to change it over to Navy or in some cases to JCS format before it was passed to CINCPAC, and before it was passed on to the JCS."[55] The Air Force soon remedied that problem by switching to the Navy's OPREP

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[54] Ryan, OHI transcript, p. 50.
[55] Clement, OHI transcript, Dec. 4, 1968, p. 6.

(operational report) system, which consisted of message formats numbered from OPREP-1 through OPREP-5. As previously explained, the OPREP-4 message contained initial strike results and was the message type most germane to bombing effectiveness reporting.

Flying unit and Seventh AF critiques of OPREP-4 processing have already been described, but PACAF staff members voiced additional concerns about how the system may have distorted bombing data. Captain Clement (who later served a tour at Seventh AF headquarters) worked in the PACAF command center from March 1965 to October 1967. He noted a sharp decline during his tour in the amount of detail flying units included in their OPREP-4s and recalled, "When this [OPREP] system initially started, the pilot would come back with sometimes several paragraphs, comments from each one of his flight members. We got trucks – one bomb hit right on the hood of a truck. I saw three palm trees fall over it. ... Which [in] my way of thinking [is] the way the system should be." Clement suspected that the troubles began when the electronic report reached a hypothetical Pentagon official hours later, "The guy sitting in a soft chair at the JCS says, 'You saw how many palm trees fall over?' ... 'You say you saw ten trucks, but you only hit one of them?' ... 'you had all kinds of ordnance, why didn't you hit this target?'" Officials began sending those questions down the chain of command, demanding quick answers from the pilot. Clement said intermediate headquarters such as PACAF might try to screen the questions by asking if the caller really needed an immediate answer and explaining that due to the time differential between Washington and Southeast Asia the pilot was probably asleep and might have another combat mission scheduled early the next

morning. Sometimes the caller demanded the pilot be awakened to make a secure telephone call to answer the questions.[56]

The higher headquarters questioning had a chilling effect on pilot reports. Clement lamented, "So here's a pilot that's trying to do a job, at squadron level, got to fly missions, and here we are asking him questions on the number of palm trees that fell across the road, the number of trucks he saw versus the number of trucks he destroyed." Consequently, Clement noticed "it degenerated from a real nice OPREP-4 that told us a lot to no BDA due to smoke and dust." He understood smoke and dust obscured pilots' visibility, but said, "I'm positive in a lot of cases, he [the pilot] saw some things and either wasn't a hundred percent positive or didn't want to get queried … we had a real good system and we pestered the crews … with messages and phone calls so bad that they just set up their own system of not passing information upstream." The situation disturbed Captain Clement, who said, "I know that the generals there [at headquarters] want this information and really require a lot of it to make decisions," but he urged moderation in the amount of information requested in OPREP-4s and in follow-up questions from headquarters.[57] The parallels between Clement's comments about seeking a happy medium and the similar remarks made by 8th TFW intelligence chief Lt. Col. Allison are striking.[58] By trying too aggressively to acquire detailed results, the OPREP-4 system may have discouraged voluntary inputs, leading pilots to report the minimum required amount of detail.

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[56] Clement, OHI transcript, Dec. 4, 1968, pp. 9-10.
[57] Clement, OHI transcript, Dec. 4, 1968, pp. 9-11.

In addition to gathering data and relaying reports, PACAF performed some important analytical functions directly related to Rolling Thunder targeting decisions. The analyses probed bombing's second order effects and both complemented and competed with analogous Seventh AF activities such as those Lt. Col. Blackbird described.[59] Colonel Pat Goforth, PACAF Deputy Director and Director of Targets from February 1966 to August 1968, thought, "The targeting function of damage assessment became one of the major activities of both Headquarters PACAF and Seventh Air Force Directorates of Targets (DIT)." He said the "traditional" BDA used to track "air strike effectiveness on a daily basis" was only part of the two headquarters' assessment efforts. Line of communication (LOC) activity analysis in each organization became "an unanticipated major involvement developed in the assessment area which was peculiar to the war in SEA [Southeast Asia]."[60]

Goforth said that LOC activity analyses began "as a small effort to report the results of the rail campaign," but quickly expanded to include roads and waterways. Analysts studied road conditions, construction of new routes and bypasses, truck parks, and supply storage areas, hoping to support interdiction efforts by understanding enemy traffic patterns. They also hoped to calculate the enemy transportation system's carrying capacity and the amount of war material it was actually transporting to the South. The latter parameter was often termed "throughput." The PACAF Director of Targets wanted the LOC activity reports to be more than statistical summaries, so Col. Goforth and the

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[58] See Allison, OHI tape.
[59] See Blackbird, OHI transcript, pp. 33 and 57.

rest of the staff began producing weekly reports that emphasized trends rather than daily

information. Goforth thought, "This trend analysis was more meaningful for planning

purposes than were statistical tabulations of data submitted on a daily basis." Merging the

trend analyses with the statistics "produced data that was far more accurate than data

compiled solely [from] the OPREPs-4." Overall, Goforth judged the PACAF LOC

analysis reports superior to analogous work done at Seventh AF because, "At Seventh Air

Force, daily tabulations based on OPREPs-4 were being kept but this amounted to a

'bean-counting' job and did not really give a complete picture of the activity on the

LOCs."[61] Pacific Air Forces analysts in Hawaii felt they could achieve a more

comprehensive synthesis of the available raw data than their counterparts closer to the

action in South Vietnam – at least in some respects.

Reconnaissance photos were important ingredients in PACAF target analysis, but

the staff had problems handling the torrents of images flowing through the headquarters.

Much like the situation at Seventh AF, the leading PACAF problem was how best to

process the pictures received. Colonel Goforth thought many PIs arrived at PACAF

without proper training or experience. He felt that most USAF photo interpretation

training courses taught before Rolling Thunder had emphasized the target types found in

industrialized countries like Europe and the USSR rather than the very different kinds of

facilities typical of North Vietnam. Personnel from SAC were experts at radar prediction

and interpreting photos of temperate or arctic landscapes while PIs from European bases

[60] Col. Pat E. Goforth, OHI transcript, Jan. 5, 1970, K239.0512-391, in USAF Collection, AFHRA, p. 3.
[61] Goforth, OHI transcript, pp. 3-5.

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were used to pictures of fixed installations. New personnel adapted to Vietnamese

conditions, but Goforth was convinced the one-year tour length policy in Southeast Asia

exacerbated PACAF's photo interpretation woes. He concluded, "the difficulties

encountered in establishing a stable, efficient, effective targeting program can really be

blamed on the rapid turnover of the personnel."[62]

Achieving proper integration between photography and other intelligence sources

was as vexing a problem for PACAF as it was for Seventh AF. Seventh AF staff member

Lt. Col. Blackbird lamented the 13th Recce Tech Squadron reorganization that divided

analysts into sections specializing in single types of intel sources, and he thought some

analysts were too "source focused" on single intel types – especially photos.[63] Pacific Air

Forces engaged in a similar debate about mixing intel sources, but reached different

conclusions. Colonel Goforth detected two schools of thought in PACAF concerning how

much information to give photo interpreters. One position advocated insulating PIs from

other intel sources to keep analysts from "imagining things on the film that were not there

in reality."[64] Goforth said PACAF rejected that view in favor of providing the PIs all

available data, including "special intelligence" (highly-secret communications intercepts),

FAC and aircrew reports, and HUMINT (human intelligence from spies and informants).

Much like Lt. Col. Blackbird, his Seventh AF colleague, Col. Goforth believed that the

best bombing assessment and target development resulted when analysts understood the

campaign's objectives and had maximum information from multiple sources.

[62] Goforth, OHI transcript, pp. 13-14.
[63] See Blackbird, OHI transcript, pp. 19-20.

Pacific Air Forces expected analyses and briefings to lead to decisions about the

bombing campaign. Goforth felt, "These LOC analyses were fundamental to assessments

of enemy activity, evaluation of strike effectiveness, and to estimates of men and materials

being infiltrated into SVN" because planners and commanders at Seventh AF, PACAF,

and PACOM all used them. The Commander-in-Chief of PACAF and the Seventh AF

Commander received daily briefings on LOC activity while Admiral Sharp received a

biweekly summary briefing. Colonel Goforth said that based on the LOC analyses,

"recommendations were frequently made both to Seventh Air Force and CINCPAC for

strikes against certain targets and target systems." Some of the recommendations led to

target approvals. The staff also analyzed and recommended other potential target systems

such as dikes, dams, and river locks, but higher authorities rejected those suggestions.[65]

Intel analyses need to be transmitted beyond the headquarters to influence bombing

policies and methods so PACAF headquarters prepared an assortment of periodical

intelligence reports to communicate its findings and conclusions. The CHECO Reports,

which sought to record air power's role in Vietnam and derive "lessons learned," were

prominent examples of the formal, published reports the headquarters commissioned. The

Air Staff in the Pentagon supervised Project CHECO, but PACAF published the reports.

The term CHECO was an acronym whose meaning changed several times from the

program's inception in 1962. The original meaning was Current Historical Evaluation of

Counterinsurgency Operations. In 1965, it became Contemporary Historical Evaluation of

[64] Goforth, OHI transcript, p. 17.
[65] Goforth, OHI transcript, pp. 3-4, 6-7.

Counterinsurgency Operations, but changed in 1966 to Contemporary Historical

Examination of Combat Operations. The final 1968 permutation was Contemporary

Historical Examination of Current Operations. Reflecting PACAF's broad responsibilities

for the overall USAF effort throughout the Pacific region, the headquarters wrote over

200 reports, but only three dealt exclusively with Rolling Thunder. Others discussed air

operations in South Vietnam and other places, specific aerial functions such as search and

rescue, or how air power had supported a particular ground battle.

The three CHECO Rolling Thunder reports divided the campaign chronologically

into the period before July 1965, from July 1965 to December 1966, and from January

1967 to November 1968. According to each report's distribution list, distribution of the

first report was very small, but increased sharply with both subsequent issues. Only 40

copies of the July 1965 report and 99 copies of the 1965 – 1966 report were distributed.

Recipients were limited to PACAF, the Pentagon, and a few other USAF agencies. The

1967 - 1968 report's distribution was much wider with 204 copies sent to joint staffs,

major commands, headquarters, and military staff schools worldwide.

The CHECO Reports tried to present balanced appraisals of Rolling Thunder and

included criticisms of both administration and USAF policies. Admiral Sharp's

perspective figured prominently and the reports documented his opposition to the

"stereotyped pattern of operations" whereby planes had to bomb a few approved fixed

targets repeatedly until photo reconnaissance showed prescribed damage levels had been

inflicted.[66] Sharp wanted subordinate air commanders to have a wider target selection and more operational flexibility. The CHECO Reports also cited analyses from RAND Corporation, an independent Air Force think tank, which tended to express skepticism about Rolling Thunder's prospects even if political restraints were eased.

The CHECO Reports revealed where most of their information originated, but were written for an audience already well acquainted with Rolling Thunder. Methodical footnoting was a distinctive feature of all the reports. Most footnotes referred to official messages and reports exchanged between commanders and headquarters staffs. Report writers often interviewed people who had participated in events relevant to the reports. Many of the materials cited summarized significant bombing mission results. Other references were more vague such as the comment that, "Special reconnaissance over North Vietnam in May [1965] showed that prior to the special Rolling Thunder program (13 May) they [North Vietnamese] had become accustomed to BDA flights in support of strikes."[67] Other comments referred to "Trojan Horse high altitude photo intelligence" and "BLUE TREE photo reconnaissance" in ways that presumed readers were already familiar with those programs.[68] The reports also readily admitted when data were unavailable such as during especially bad weather in early 1968 when, "Bomb damage assessment (BDA)

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[66] Headquarters PACAF, Tactical Evaluation Center, Project CHECO, "Rolling Thunder," (through mid-1965), p. 60. (Cited hereafter as "CHECO Report" followed by title)
[67] CHECO Report, "Rolling Thunder," (through mid-1965), p. 54.
[68] CHECO Report, "Rolling Thunder," (through mid-1965), p. 54 and "Rolling Thunder, July 1965 – December 1966," pp. 31-32 and 45.

was, of course, negligible, thus grossly reducing the ability to assess the effectiveness of

the strikes."[69]

The reports integrated information from diverse sources into a rather broad

assessment of first, second, and occasionally third order bombing results. Narrative

summaries of air operations were mostly factual and were packed with numerical details

such as how many planes flew a particular mission, how many bombs they dropped, how

many bridge sections collapsed, and how many planes were shot down. Tables listing

target categories and the numbers of each target type damaged and destroyed per month

appeared occasionally. The number and titles of the target categories changed with each

report. The 1967 to 1968 report's 14 categories matched those used in Rolling Thunder

Digest, a periodical PACOM report to be discussed later, but differed from Admiral

Sharp's six target systems. Those 14 categories were AAA sites, SAM sites,

communication sites, military areas, POL, staging/supply, buildings, LOCs, ports, power

plants, railroad yards, motor vehicles, railroad vehicles, and water vehicles. When

describing bomb damage, the degree to which a target was "serviceable" was a common

criterion. Serviceability was a measure of how well a facility could perform its intended

function rather than a simple statement of how many bombs had struck it, how many

secondary explosions had occurred, or what percentage of the structure had been

demolished. The Rolling Thunder CHECO Reports – especially the second and third ones

- thus marked a more analytical assessment than the data flying units typically gathered.

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[69] CHECO Report, "Rolling Thunder, January 1967 – November 1968." p. 20.

The reports also excluded some types of information that might have reflected

bombing effectiveness. Only one of the three reports referred to numbers of enemy

soldiers killed by air (KBA) and that instance involved an operation to support Marine

Corps operations just north of the DMZ. Like Seventh AF intel chief Brig. Gen. Jammie

Philpott's report about Operation Neutralize, the only time the PACAF reports discussed

enemy casualties was when bombing was in close proximity to U.S. ground troops. Like

most flying unit and Seventh AF reports, the CHECO Reports neither mentioned nor

contained any statistics about enemy civilians who may have been killed or injured.

The content and arrangement of the three CHECO Rolling Thunder reports

changed over time. The first report on Rolling Thunder's opening months was not

published until March 28, 1966 – over a year after the campaign had begun. That report

included a synopsis of events leading up to the Flaming Dart strikes of early 1965 and the

first Rolling Thunder missions up through mid-1965. Most of the text was a

chronological account of events divided into chapters on Flaming Dart, the start of Rolling

Thunder, enemy anti-aircraft defenses, and the extension of Rolling Thunder above the

20th parallel. Short sections describing USAF unit dispositions and commenting about

leaflet-dropping operations over the North rounded out the text.

Comments about bombing assessment were sprinkled throughout the first report,

but that edition seemed more descriptive than analytical and tended to summarize data

collected by squadrons and wings without adding much insight. The report characterized

results through mid-1965 as "impressive" and included a table listing numbers of bridges,

buildings, railroad cars, *etc.* damaged and destroyed and the number of planes lost. Flying

units reported similar facts, but other statistics such as numbers of sorties flown and tons

and types of ordnance expended were less typical of the parameters flying units advertised.

The report even included a lengthy transcript of a Chinese radio broadcast lauding the

North Vietnamese people's heroic efforts to overcome the bombing.[70] The first CHECO

Report implied the campaign was off to a good start, but more targets needed to be

approved because "there was still a potentially significant target area in North Vietnam

which had remained free from air strikes" through mid-1965.[71]

The second CHECO Report on Rolling Thunder operations from July 1965 to

December 1966 was more ambitious and analytical than the first one. Separate chapters

summarized bombing highlights during each of the three six-month intervals covered.

Another chapter discussed anti-aircraft defenses, and the last section entitled "Review and

Analysis" presented statistics and comments assessing overall results. Assorted maps,

photos, graphs, and tables supplemented the text.

The first report had been mostly a summary of events with limited evaluation, but

the second one seemed more focused on assessing the campaign's success. The second

CHECO Report's foreword revealed the wide assortment of effectiveness criteria

evaluated and is worth citing at length:

> For the present, it can be said that air operations have not stopped the flow
> of men and material from the North into South Vietnam, but they have
> forced Hanoi to pay a heavy price for its continued support of the
> insurgency. They have not brought Hanoi to the point of negotiating peace
> terms nor caused a complete demoralization of the North Vietnamese.
> However, air strikes have caused serious economic dislocations in the

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[70] CHECO Report, "Rolling Thunder," (through mid-1965), pp. 65-69.
[71] CHECO Report, "Rolling Thunder," (through mid-1965), p. 67.

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North and dramatically illustrated U.S. power and determination – as well as restraint. The cumulative effect of the selective bombing of North Vietnam targets cannot be currently assessed, but it will probably have considerable impact on communist plans for the future conduct of the war. The ROLLING THUNDER program unquestionably has had a salutary effect on the morale of our South Vietnamese allies. These accomplishments are especially noteworthy when viewed against the numerous political restraints which have hindered the effective employment of air power.[72]

The references to paying a heavy price, negotiating peace, economic dislocations, cumulative effects, future communist plans, South Vietnamese morale, and bombing's success despite political restraints encapsulate many themes senior leaders discussed. Few single quotations compress so many of those criteria into so few words. Later chapters will examine those themes in detail.

The second CHECO Report's "Review and Analysis" chapter said there were two ways of judging Rolling Thunder's success. Statistical analysis was one method, but "not all of the achievements of ROLLING THUNDER could be quantified. It would be impossible to statistically portray the effects of the bombing on North Vietnamese morale or its impact upon communist strategic policies."[73] The comment's meaning is left open to interpretation, but probably suggests PACAF deemed the bombing more - not less - effective than the statistics indicated. Curiously, the report did not name the other way of judging success, but the other way apparently included everything except statistics.

The third and final CHECO Report about Rolling Thunder was published in late 1969 (eleven months after the campaign had ended) and was less detailed than the second

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[72] CHECO Report, "Rolling Thunder, July 1965 – December 1966," pp. vi-vii.
[73] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 124.

report had been. The first two chapters briefly summarized 1967 operations without discussing prominent strike missions or providing many other details. The sketchiness was surprising since mid to late 1967 witnessed significantly expanded target approvals, including strikes against most MiG airfields. The third and fourth chapters surveyed 1968 operations with a strong emphasis on the Rolling Thunder Target List (RTTL), an item to be described later. Extremely poor weather hindered flying during the Tet Offensive, which began in late January, but the coverage of other 1968 activities was also surprisingly cursory. The remaining chapters featured statistics and analyses of trends in sorties, target damage, *etc.* An epilogue lamented how the North Vietnamese had rapidly restored their economy and transportation infrastructure to levels greater than what had existed before Rolling Thunder's start. Perhaps the final report's late publication date accounts for its lackluster tone. Pacific Air Forces' interest in Rolling Thunder may have waned after President Johnson terminated the campaign in late 1968. In theory, the CHECO Reports' avowed purpose of gleaning lessons learned should not have been affected by the campaign's disappointing end, but the reality may have been different.

Pacific Air Forces was the USAF component of PACOM, and Admiral Sharp's PACOM headquarters integrated Air Force and Navy bombing results into a somewhat wider ranging appraisal than the PACAF reports which confined themselves to USAF activities. A publication called Rolling Thunder Digest (abbreviated herein as Digest) was a quarterly assessment PACOM prepared. The Digest's first edition covered the July to September 1966 period and the second through ninth editions appeared regularly through

September 1968.[74] The reports claimed to be "presenting the air operations of the United States against North Vietnam, and the effects of these operations."[75]

The Digests' organization and content changed slightly over time, but some features stayed constant. Each issue was about 30 to 50 pages long and organized into five or six sections. Section I gave a brief outline of the campaign's objectives and described the route package layout. Section II was entitled "Rolling Thunder Evaluation" (or similar wording) and presented broad assessments encompassing bombing's military, economic, and psychological dimensions. Military assessments predominated while the economic and psychological comments were usually cursory.

The arrangement of subsequent sections varied from one edition to the next, but always included an "Operations Highlights" section that discussed selected representative targets. Aerial photography of bomb damage dominated that section, which featured separate subsections for each month of the quarter. A table listing 14 target categories showed numbers of each target type destroyed or damaged each month. Rolling Thunder Digest categories were separate from CINCPAC's six target categories and consisted of AAA sites, SAM sites, communication sites, military areas, POL, staging/supply, buildings, LOCs, ports, power plants, railroad yards, motor vehicles, railroad vehicles, and water vehicles. Those 14 target categories were identical – even in the order they were listed – to those depicted in PACAF's CHECO Report covering the 1967 to 1968 period; however, the earlier CHECO Reports had used different categories. The Digest's

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[74] The campaign ended November 1, 1968, but the author has not been able to determine if a tenth edition covering October 1968 was ever published.

narrative account of monthly activity sometimes itemized damage to each part of large facilities such as power plants or the steel plant. Operations highlights discussions often included estimated target repair times.

New sections appeared as time passed. All editions beginning July – September 1966 included a section about air defense activity and trends. Numbers of MiGs encountered, SAMs launched, AAA sites active, and U.S. planes shot down were typical parameters discussed. Beginning with the January – March 1967 edition, a section about target lists appeared. Target list discussions underwent a major shift. Through the April – June 1967 edition, the JCS Designated Target list was the primary list discussed, but a new document called the Rolling Thunder Target List (RTTL) replaced the JCS list from the July – September 1967 edition onward. The Digests typically noted how many targets on the lists had been struck and characterized the status of target categories such as POL, electric power, etc. Chapter 5 will describe the JCS target list and the RTTL. Other Digest sections featured a different topic in each issue such as special reports on the 1966 POL campaign or on some major railroad interdiction effort. Maps, statistical tables, and graphs were prominent in all sections.

Rolling Thunder Digest acknowledged that limited bomb damage data availability influenced effectiveness assessments. Weather obviously obscured target visibility during some seasons, and the reports repeatedly said BDA was unavailable for some strikes. However, the first two editions hinted at a more fundamental imponderability regarding

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[75] Headquarters PACOM. Operations Division, Rolling Thunder Digest, all volumes, p. 1.

damage assessment. In the first edition, the Section II evaluation discussion began with the comment; "Hard information useful in making quantitative estimates of the effects of our Rolling Thunder operations upon North Vietnamese intentions and capabilities is difficult to obtain. Because of this there is a tendency to limit estimates to those supported by positive evidence." The second edition expanded that comment to include "qualitative as well as quantitative" estimates.[76] Those comments implied that the availability of "positive evidence," rather than the PACOM planners' preferences, determined the bombing effects discussed and suggested PACOM intended to avoid mere speculation and confine analyses to effects for which dependable data were available. However, such intentions may not always have prevailed in practice.

The comment about "hard information" being difficult to obtain vanished from the third and subsequent editions. The April – June 1967 edition's Rolling Thunder Evaluation section showed one method of handling hard-to-measure effects when it said, "The damage inflicted upon North Vietnamese targets by RT operations continues to be cumulative in nature, particularly in those areas where direct measurement of damage is difficult to assess."[77] How analysts knew damage that was difficult to assess was therefore "cumulative" is unclear, but as Chapter 9 will show, military officials had a penchant for talking about bombing's cumulative effects.

Damage to military targets dominated the analyses, but the reports also cited second and third order economic and psychological results attributable to bombing.

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[76] Rolling Thunder Digest, Jul. – Sep. 1966, p. 4 and Oct. – Dec. 1966, p. 8.
[77] Rolling Thunder Digest, Apr. – Jun. 1967, p. 7.

Diversion of enemy manpower to repair and road construction, reduction of exports, and

Hanoi's curtailment of long term industrial development projects supposedly revealed

bombing's economic effects. Reports noted average times required to unload ships at

Haiphong harbor and sometimes cited "usually reliable sources" when describing unrest

among dockworkers or other signs of stress. Electricity shortages, urban evacuations, and

air raid alerts disrupted industrial production and induced "pressures and strains." Reports

said that civilian morale and government propaganda suggested hardships, but conceded,

"The flow of supplies and personnel into SVN continues in sufficient quantity to sustain

the present level of insurgency effort" and "there is no apparent indication of a change in

the official Hanoi position on negotiations or ending the aggression and insurgency."[78]

Unlike CHECO Reports, Rolling Thunder Digest rarely revealed where its

information originated, but most probably came from military sources. Ordinary strike

and photo recce planes evidently provided most pictures used in the Digests, but the final

edition covering July – September 1968 showed photographs taken by unmanned drones

called "Bumpy Action" which may have been the same as or similar to the Q-34 drones

General Momyer described.[79] The drones were operating well north of the 19th parallel in

an area then off limits to any bombing. Some aerial photos were obviously taken from low

altitude, but others may have come from high-flying aircraft such as the U-2 or SR-71.

Additional circumstantial evidence for U-2 or SR-71 imagery comes from remarks such as

"Simultaneous photo coverage of all NVN jet capable airfields," "near simultaneous

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[78] Rolling Thunder Digest, Apr. – Jun 1967, p. 8, Jul. – Sep. 1966, p. 4 and Oct. – Dec. 1966, p. 8.
[79] See Momyer, Air Power in Three Wars, p. 233 for his Q-34 drone remarks.

coverage of a large number of [SAM] sites," and "For the first time, simultaneous

[photographic] readout over large areas has been possible."[80] Such broad coverage would

have been difficult to obtain without a fast, high-flying recce platform. Late in the

campaign, information from FACs gained prominence. Editions published through 1967

almost never mentioned FACs, but the 1968 issues made frequent reference to forward air

controller observations of strikes against trucks and watercrafts – especially after bombing

was restricted to the lightly defended southern panhandle.

Some remarks contain clues suggesting the Digests also included intelligence data

from non-military sources – specifically from CIA/DIA reports. While describing civilian

morale, the Oct. – Dec. 1966 report said, "there does appear to be increased concern over

the morale of the populace. An analysis of letters from individuals in North Vietnam to

relatives in Thailand reflect [sic] increasing pessimism."[81] Scrutinizing private

correspondence between people in foreign countries seems an unlikely activity for U.S.

military intelligence operatives, but the Central Intelligence Agency (CIA) might

conceivably have used such methods. The Digest's PACOM authors were almost

certainly privy to secret reports and analyses prepared by the CIA and other covert

organizations and might have incorporated some information from those sources. In fact,

the October 1966 edition of a joint periodical CIA/DIA report entitled An Appraisal of the

Bombing of North Vietnam referred to "a recent field study of 314 [word deleted] letters

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[80] Rolling Thunder Digest. Apr. – Jun. 1967, p. 29, Jul. – Sep. 1968, p. 15, and Oct – Dec. 1967, p. 49.
[81] Rolling Thunder Digest. Oct. – Dec. 1966, p. 8.

sent from North Vietnam [words deleted] between 1 May and 31 August of this year."[82]

The deleted sections were blacked out, having been censored from the report during the declassification process. The proximity of the two reports' publication dates and their similar wording implies the Rolling Thunder Digest writers at PACOM may have seen the CIA/DIA report. If so, one might speculate that the second blacked out part of the CIA/DIA text may have contained the words "to relatives in Thailand," since the blacked out portion's length looks about right to contain those words. This chapter will later describe the CIA/DIA reports in more detail.

Pacific Air Forces and Pacific Command were closely intertwined and their close relationship shows in their Rolling Thunder assessment roles. The USAF organization was essentially a subsidiary of its parent joint service command and behaved accordingly. The two organizations do not seem to have openly disagreed about interpreting bombing results. Publications such as the CHECO Reports and Rolling Thunder Digest represented divisions of labor rather than divisions of opinion. The primary difference between the two headquarters was PACAF's focus on evaluating USAF operations compared to PACOM's integration of Air Force and Navy operations.

Air Staff and JCS

The highest echelon of USAF authority resided in the Pentagon with the Air Staff and Joint Staff. Neither organization made day-to-day decisions about the air war, but

[82] CIA/DIA Appraisal, Oct. 1966, p. 9.

instead gathered information and made recommendations. The Air Staff served Chief of

Staff Gen. John McConnell. The Secretary of the Air Force (Harold Brown from late

1965 until 1969) maintained another staff and was Gen. McConnell's civilian supervisor,

but was not in the military chain of command. Brown represented civilian control of the

military and handled broad USAF policy issues.

The Air Staff managed two ongoing programs designed to document and assess air

power's performance during the Vietnam War. Project CHECO, described earlier in this

chapter, began in 1962 and was the first effort. Administered primarily by PACAF, which

published its reports, CHECO's mission was to perform "on-scene reporting and analysis

in support of Air Force planning."[83] Both civilian and military analysts, including Air

Force Academy faculty members, worked for the project. The Air Staff plans directorate

and the Air Force history program employed a few historians in PACAF, 2nd AD, and later

in Seventh AF to collect messages, after-action reports, end-of-tour reports, and to

interview key people. Interviews were usually short and focused on specific operations

in which interviewees had participated. An interview catalogue noted that pilots and other

field unit personnel usually expressed candid opinions, but senior leaders "tended to be

more guarded in their comments than junior people who had engaged in specific

operations."[84] Project CHECO wrote 218 reports on USAF operations in Southeast Asia,

including the three previously described Rolling Thunder reports.

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[83] Maryanow, Maurice, ed., Catalog of the United States Air Force Oral History Collection, (Maxwell AFB, AL: U.S. Air Force Historical Research Center, 1989), p. xviii. [83]

[84] Maryanow, p. xvii.

Kenneth Sams was a civilian CHECO analyst in Saigon who served seven years, became project chief, and developed strong opinions about the quality of the reports produced. Reflecting on his experiences during a 1987 interview, Sams was rather embittered and gave a mixed review of how well Project CHECO had fulfilled its assigned role. He said, "I see my role as Chief CHECO 1964 to 1971 as having been the Bureau Chief for Air Force Press in Saigon, reporting on the war for a select group of subscribers in top echelons of the Air Force community."[85] Although he viewed himself as writing for an Air Staff audience, intervening commanders in Vietnam reviewed his reports and strongly influenced their orientation. When Gen. Momyer took over Seventh AF in 1966, he wanted CHECO to shift from its previous counterinsurgency focus to a heavier emphasis on Rolling Thunder. Disputes between different commands and headquarters over data or conclusions could also pressure CHECO analysts.

Sams recalled that local bureaucratic pressures could be severe. He was outraged by a 1968 episode in which an unnamed Air Force Brigadier General from intel devised a plan to stop all Ho Chi Minh trail infiltration. The general picked five targets upon which USAF bombing focused from July to September 1968. The general boldly proclaimed the operation had "stopped the movement of all traffic from North Vietnam" and sent his report to Seventh AF for coordination and approval. After consulting with CHECO personnel, a civilian Seventh AF headquarters analyst who disputed the report was fired and Sams' CHECO team was "literally ordered" to endorse the general's conclusion,

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[85] Kenneth Sams, OHI transcript, Nov. 29, 1987, K239.0512-1856, in USAF Collection, AFHRA, supporting memo attached to transcript.

allegedly because the findings would have "fit in neatly" with Richard Nixon's 1968

Presidential election campaign promise to shift ground fighting over to the South

Vietnamese and have air power handle interdiction. Sams felt that incident had

compromised CHECO's integrity as an impartial source of information.[86]

Sams' interviewer, Lt. Col. John Clark Pratt, had also served in Vietnam as a

CHECO officer, and recalled another example of interference with CHECO's impartiality.

Shortly after Rolling Thunder had ended, a colonel with some authority over CHECO

supposedly demanded that a report being written not say that F-4s could not hit trucks

with bombs. Pratt countered with an anecdote about a captured North Vietnamese truck

driver who had told his interrogators, "when he heard A1s [a propeller-driven strike plane]

coming in he would run like hell for the woods, but when he heard an F-4 or jets he would

hide under the trucks, [because] that was the safest place."[87] Pratt did not provide enough

specifics to permit a definitive determination of how the colonel's pressure influenced the

report's content.

Despite such influences, Sams considered CHECO Reports as accurate as any

assessments prepared by the DIA, RAND Corporation, or other agencies and said, "I

think CHECO's greatest utility was always the fact that it was read back in the Air Staff

by people who needed to know what was going on."[88] Sams thought CHECO was an

important tool for assessing combat operations and insisted reports have immediate

applicability, not merely historical interest. He did, however, feel the reports unavoidably

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[86] Sams, OHI transcript, p. 22.
[87] Sams, OHI transcript, p. 23.

expressed an Air Force perspective, and cautioned, "I would not accept what is said in every CHECO report just because it's there."[89]

Captain Edward Vallentiny, who served as a CHECO analyst in Vietnam and Thailand from early 1968 to early 1969, also deemed the project and its reports valuable despite some shortcomings. During a 1970 interview, he acknowledged that overlapping supervision by Seventh AF, PACAF, and the Air Staff had led to some confusion. He also recalled headquarters reviewers objecting to a report's content or saying, "I don't like the tone of this report," but said such instances were rare.[90] Preserving records that would have been lost was a primary CHECO benefit Vallentiny cited. He noted that documentation older than six months was hard to retrieve because most USAF units destroyed their old files. Such destruction complicated attempts to evaluate the effectiveness of previous plans – especially when personnel served such short tours and were largely unaware of what their predecessors had done. Referring to a previous year's aerial interdiction plan against North Vietnam, Vallentiny recalled, "The point is that last year's plan has already been thrown away. It's not generally kept on file any place or at least it's missing in Southeast Asia."[91] He deemed the "CHECO Data Collection System" established in 1968 an important means of capturing previous experience by microfilming documents before they were destroyed. If CHECO could assess how well previous air

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[88] Sams, OHI transcript, p. 51.
[89] Sams, OHI transcript, p. 50.
[90] Capt. Edward Vallentiny, OHI tape, May 8, 1970, K239.0512-270, in USAF Collection, AFHRA.
[91] Vallentiny, OHI tape.

plans and operations had worked, then perhaps the Air Force could devise better plans and operate more effectively in the future.

Project Corona Harvest was a broader Air Staff effort to assess Vietnam War air operations. Vice Chief of Staff Gen. Bruce K. Holloway inaugurated Project Corona Harvest in 1967, intending "to evaluate the effectiveness of air power in Southeast Asia."[92] Rolling Thunder was only one small part of the enormous project that tried to analyze all air power activities and derive tangible recommendations for the future. The Corona Harvest Project Office in the Air Staff coordinated teams of analysts working at Air University in Alabama and PACAF Headquarters in Hawaii. All Air Force commands were required to submit reports to those analysts about how they were supporting the Vietnam War. The analysts sifted through those reports, along with oral history interviews and other sources, to write Corona Harvest reports. Air Staff committees reviewed the reports, looking for specific lessons learned. Such lessons proved elusive, but the interviews and reports did represent a systematic collection and analysis of information. Corona Harvest's late start meant Rolling Thunder activity prior to 1967 received less attention than subsequent operations.

Corona Harvest and CHECO ran concurrently from 1967 through the end of Rolling Thunder and beyond, yet the demarcation between them was blurred. Sams and Pratt were obviously inclined to view their own CHECO program favorably, but they

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[92] Maryanow, p. xviii.

agreed having both CHECO and Corona Harvest was "a very unnecessary duplication of effort," and they lamented that many people confused the two programs.[93]

The JCS was the interface between the military and the Johnson Administration, and was a point at which Rolling Thunder assessment passed beyond Air Force purview. All the service chiefs had a voice in interpreting bombing results, but seldom expressed dissenting opinions. They almost invariably supported Rolling Thunder and argued that the administration's restrictive policies were degrading the bombing's effectiveness. Seventh AF, PACAF, and PACOM were mostly concerned with prosecuting the war, but the JCS strove to build political support behind bombing policies the military favored. The JCS did not really measure bombing effectiveness or make operational decisions about how Rolling Thunder would be conducted, but concentrated on finding ways to present data that would persuade decision makers in the administration (and occasionally Congress) to conduct the campaign according to military recommendations. Reports and analyses covering every conceivable aspect of the war came out of the Pentagon's labyrinthine corridors, but many repackaged information originally generated by other organizations. The JCS reviewed and often adjusted PACOM's bombing recommendations before forwarding them to the Secretary of Defense. The Secretary, in turn, consulted other administration figures such as the Secretary of State before presenting his findings to the President. The Secretary of Defense was extremely

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[93] Sams, OHI transcript, p. 42.

influential, but the President made the ultimate decisions about whether the bombing was achieving his political objectives or whether policy changes were required.

Other Intel Agencies

The preceding survey of how different Air Force and other military command levels analyzed bombing results excluded some relevant activities. Military organizations did not work in isolation when determining how well bombing supported American objectives, but some commentators have questioned the validity of their findings. Intelligence activities within the military were fragmented and not necessarily well coordinated. Each military service had its own intelligence branch that interpreted the results achieved by that service. Some critics doubted that system was a reliable information source because Air Force and Navy analysts tended to be sympathetic to their respective services' contributions. James Clay Thompson, a Defense Department analyst, thought that the wrong organizations performed measurements. Military intelligence agencies charged with monitoring the campaign's progress were supervised by the military so Thompson believed "an inevitable conflict of interest" developed whereby those intelligence agencies were pressured to support views of the services performing the bombing. He concluded, "valid program evaluations cannot be done by the organizations charged with implementing them."[94]

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[94] James Clay Thompson, Rolling Thunder: Understanding Policy and Program Failure, (Chapel Hill, NC: The Univ. of North Carolina Press, 1980), p. 150.

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Single-service intelligence organizations did not monopolize bombing data analysis. A wide assortment of secretive government agencies collected and scrutinized information from diverse sources. The Defense Intelligence Agency (DIA) was a hybrid organization that combined elements from all the military intelligence departments into a single entity. Ideally, DIA would fill Defense Department needs for information relatively free of parochial service perspectives and biases. The Central Intelligence Agency (CIA) was further removed from the military services and was primarily a civilian agency. The RAND Corporation was a civilian organization that served as an Air Force think tank and prepared bombing effectiveness studies, but did not necessarily endorse Air Force policies. The State Department had its own intelligence section that was designed to support diplomatic initiatives by assessing bombing's influence on issues such as peace negotiations with the North Vietnamese government. Additional entities such as the Board of National Estimates, Department of Defense Systems analysts, and numerous *ad hoc* committees of independent experts also played bombing assessment roles, but since this work emphasizes the USAF perspective, it will devote only limited attention to most of those groups. Coordination between different agencies would hopefully mitigate the biases and conflicts of interest lurking in data gathered by separate organizations, but coordination was uncertain in practice.

Many military authorities agreed their existing bombing assessment methods were inadequate when Rolling Thunder began and proposed improved procedures. Referring to the Flaming Dart raids that occurred just before Rolling Thunder, a PACAF report noted, "Prior to the first strikes on 6 February, there was no low level tactical recce program for

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North Vietnam. Photography for targeting had been collected by the U-2 and other strategic recce programs and was not suitable for detailed operational planning which would allow the most effective tactics and weapons delivery."[95] At about the same time, Admiral Sharp proposed ways to remedy the problem and called for "low level recce conducted in coordination with air strikes to complement intelligence data currently held. This would allow penetration of jungle canopies, foliage, and camouflage which concealed infiltration installations, and convoys. It would also confuse defenses and serve to keep North Vietnam off balance. Intelligence data gathered from low level recce would provide a more complete base on which to plan future operations."[96] Shortly after Flaming Dart, JCS Chairman General Earle Wheeler complained, "We do not have sufficient or timely information about the results of the strikes." To remedy the deficiency, Wheeler instructed the DIA to "propose a standardized and streamlined system of after-action reporting so that prompt and responsive analysis of strike results can be made available to those who require it."[97] The desired system evolved as the campaign progressed, and generated voluminous information.

Most intel analyses prepared by non-military agencies are outside the scope of the current work, but a few generalizations about their methodology seem warranted. Military and civilian intelligence agencies often used different data types and sources and looked for different kinds of effects. Military agencies usually processed bombing data

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[95] CHECO Report, "Rolling Thunder," (through mid-1965), p. 6.
[96] CHECO Report, "Rolling Thunder," (through mid-1965). p. 16.
[97] Memo from JCS Chairman to Sec. McNamara. Feb. 23. 1965. in U.S. Department of Defense. United States - GVN Relations. (Washington. D.C.: Gov't Printing Office. 1972). IV.C.3. p. 64. (Cited hereafter

collected by their flying unit subsidiaries, but the civilian agencies added their own independent, sometimes covert, alternative sources. Non-military agencies placed heavier reliance on covert agent reports, diplomatic contacts, enemy publications, economic activities, and other sources less directly linked to air combat. Combining those sources with pilot reports and aerial photos from military sources promised a broader synthesis. As a broad generalization, the military intel agencies placed heavier emphasis on first and second order results while civilian agencies focused more on second and third order ones. Military agencies also tended to be more optimistic about Rolling Thunder's prospects than the civilian agencies. Civilian agencies' assessments often proved influential with the Secretary of Defense and the President who gradually lost confidence in the accuracy of reports prepared by military organizations.

Administration and military officials tried to integrate different information sources and may have been more cognizant of organizational biases than critics like Thompson thought. The administration did not rely upon military judgments of bombing's results and fashioned separate information channels. The periodical joint CIA/DIA An Appraisal of the Bombing of North Vietnam reports exemplified how the administration tried to mitigate the military intelligence biases critics like Thompson have described. Within months after Rolling Thunder's start, Secretary McNamara requested the two agencies to begin compiling the reports, presumably because he was not satisfied with the information he had been receiving. The CIA/DIA Appraisals merit particular attention because

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as "Pentagon Papers.")

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McNamara - as well as senior military officials - had access to them and incorporated the

Appraisals' findings into their own assessments and recommendations.

The purpose here is not to trace the Appraisals' evolution, but to describe how

they influenced senior officials assessments. The earliest report that the author has seen

was dated August 11, 1966. Reports appeared monthly through March 1968 after which

they were published quarterly while bombing was confined to the southern panhandle.

The final edition was dated October 31, 1968, the day before Rolling Thunder ended.

Distribution of the secret documents was limited to top officials such as the President,

Secretary and Assistant Secretaries of Defense, the JCS, CINCPAC, and Seventh AF.

The reports' content and organization changed little over time. Each consisted of

three sections entitled, "Effects on Military Targets," "Leadership and Public Relations,"

and "Effects on the North Vietnamese Economy," followed by one or more appendices.

One appendix was a statistical table organized by fixed target categories such as electricity

and POL. For each category in that appendix, the table showed the numbers of separate

targets, the number struck, number of attacks made, number of strike sorties flown, and

percentage of national capacity destroyed. That appendix disappeared from reports after

February 1968. The August 1966 report's economic effects section included a table

itemizing the cumulative estimate of the financial cost of repairing damaged or destroyed

enemy facilities and equipment. Starting in either November or December 1966, the

financial cost data moved to the back of the reports and became a second appendix.[98]

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[98] CIA/DIA Appraisal. Aug. 1966 and subsequent issues. The appendix listing costs was absent through the Oct. 1966 report. but present in the Dec. 1966 edition. The Nov. 1966 report was unavailable.

The Effects on Military Targets discussion summarized bombing's second order effects on systems such as POL, electricity, and transportation. The specific discussion varied depending on weather conditions and the types of attacks performed. Appraisals analyzed road, railroad, and waterway activities in a manner reminiscent of Air Force reports, but were less optimistic. Air Force intelligence reports emphasized destruction and seemed to say the glass was half full, but the CIA/DIA assessments emphasized broader consequences and described the glass as half empty.

The CIA/DIA analysts seem to have based their judgments about bombing's military effects on many of the same sources as CHECO and other military analysts used for their reports. Appraisals commonly mentioned delays and uncertainties in determining bombing's military effects. Judgments relied heavily on aerial reconnaissance, but the texts noted fixed target results were sometimes unavailable for weeks after a strike and numbers of enemy supply trucks detected were uncertain because "an indeterminate amount of these sightings includes duplication, and a precise total cannot be provided."[99] Bad weather often delayed post strike photography and radar bombing through clouds meant "definitive bomb damage assessments were severely limited."[100] Whatever covert sources the CIA and DIA may have used did not seem much more revealing than damage assessment methods the Air Force used.

The gist of most Effects on Military Targets analyses was that bombing was inflicting heavy damage, but the enemy retained sufficient capacity to continue the war.

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[99] CIA/DIA Appraisal, Dec. 31, 1967, p. 6.
[100] CIA/DIA Appraisal, Mar. 31, 1968, p. 3.

Many bridges were out, but essential road traffic still moved on pontoon bridges and even

removable sections of railroad bridges kept hidden during the day. Many rail cars were

destroyed, but enough remained serviceable to meet needs. Truck kills reached record

levels, but, reports averred, "there are no indications of any serious motor truck

transportation problems or of equipment shortages."[101] In fact, the February 1968

Appraisal reported the truck inventory was actually larger than before bombing began.

The MK-36 Destructor mines aircraft dropped in waterways had "advantages over

standard ordnance for interdicting moving traffic," but reports still concluded "the North

Vietnamese transport system is too flexible, alternate routes too numerous, and

transshipment too easy to expect dramatic results."[102] Most MiG airbases had been struck

several times by early 1968, but the Appraisals claimed few MiGs were destroyed on the

ground because large helicopters carried the jets to dispersed hidden locations until just

before takeoff, reducing the risk they would be destroyed.

The Leadership and Public Relations section was consistently the shortest part of

each report and confined itself to third order issues such as North Vietnam's apparent

political resolve to continue the war and bombing's effects on civilian morale. Comments

by diplomatic personnel from neutral nations and public statements by North Vietnamese

political leaders figured prominently. Practically every edition noted shortages of

consumer commodities and isolated signs of discontent, but said bombing was not

affecting public morale enough to influence Hanoi's war policy. Ironically, the reports

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[101] CIA/DIA Appraisal. Sep. 15, 1967. p. 8.
[102] CIA/DIA Appraisal. Dec. 31, 1967. p. 8.

said one of the few times North Vietnamese civilian morale seemed to have been shaken

was when Hanoi's claims of spectacular military success during the 1968 Tet Offensive

proved to have been exaggerated. Reports cited various clandestine information sources

to judge Hanoi's resolve such as intercepting mail sent from North Vietnam, but a 1967

Appraisal admitted, "In a Communist system, however, the significance of outward

indications of declining morale is difficult if not impossible to evaluate."[103]

The third section, Effects on the North Vietnamese Economy, addressed "direct

losses" and "measurable indirect losses." Direct losses were estimated replacement costs

of damaged or destroyed items – including military equipment. Despite the American

emphasis on military targets, only one-third of the cumulative dollar value of damage was

to military facilities by the end of 1966. Measurable indirect losses included lost foreign

exchange earnings due to export disruption and rice crop shortfalls due to labor diversion

away from agriculture. The CIA/DIA analysts acknowledged bombing's economic results

were hard to quantify. Appraisals typically noted, "In addition there are many other losses

and costs to the economy and the military establishment which cannot be assigned

values"[104] including lost production, lower productivity due to industry dispersal, work

time used for civil defense preparations, and production lost due to electricity shortages.

Like the other two sections, the economic effects discussions had a pessimistic tone,

repeatedly saying aid from other Communist countries more than offset bombing damage.

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[103] CIA/DIA Appraisal. Dec. 31, 1967, p.11.
[104] CIA/DIA Appraisal. Aug. 1966, p. 17, and Oct. 11, 1966, p. 13.

Appraisals reported only minor economic disruption related to electric generating plant damage despite destruction of most power plants.

The military and economic sections partly overlapped, but bombing's linkage to particular enemy behaviors was obscure. The appraisals consistently reported the average number of days needed to unload ships at Haiphong harbor. Long unloading times might have indicated either transportation bottlenecks caused by interdiction or increased Communist Bloc aid that exceeded the port's cargo handling capacity. Unusually large aid imports of certain items such as food might have reflected poor harvests, which might in turn have reflected manpower diversion from agriculture to military duties, but separating bombing's effects on agriculture from other factors such as bad weather was difficult.

Appraisals written before President Johnson halted bombing north of the 19th parallel were skeptical about bombing's effectiveness, but editions written after the curtailment did not characterize the new policy as more effective than the previous one. The June 1968 edition noted the allowable bombing area in the southern panhandle "contains only a few of the significant economic and military targets in North Vietnam" and said that despite the concentrated interdiction effort in the southern panhandle, lines of communication remained open and "the movement of men and supplies to South Vietnam was maintained at the highest levels observed since the Rolling Thunder program started."[105] The North Vietnamese were taking full advantage of the bombing halt to repair damage – especially to electric power plants and roads. Appraisals interpreted

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[105] CIA/DIA Appraisal. Jun. 30. 1968. pp. 1-2.

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repair activity as revealing enemy priorities and concluded that restoration of electric

plants "continues to demonstrate the importance of this branch of industry to the North

Vietnamese economy."[106] Of course, the reports had been claiming the electric plant

damage had caused only minor economic disruption. The CIA/DIA analysts noted that

repaired and expanded road networks included built-in bypasses that would increase the

difficulty of interdicting roads if bombing were resumed in the future.

The overall message was that bombing inflicted damage, but was not undermining

North Vietnamese military activities in the South. However, the reports contained a

frustratingly ambiguous mixture of comments that could please either bombing advocates

or critics. Early reports emphasized bombing's significant economic, yet modest military

results. For example, the August 1966 report said, "The cumulative debilitating effects on

the economy are becoming increasingly apparent," yet also said, "There has been no noted

change in VC/NVA military capabilities in South Vietnam which could be attributed to the

air strikes in NVN."[107] The summary at the front of the August 1966 report even placed

those two remarks on the same page. Alternatively, other reports claimed militarily

significant benefits while downplaying bombing's economic effects. For example, the

October 1966 report said, "it is estimated that the North Vietnamese capability for overt

aggression has been limited by US air actions,"[108] while going on to say POL strikes were

having no measurable effect on the economy.

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[106] CIA/DIA Appraisal, Jun. 30, 1968, p. 14.
[107] CIA/DIA Appraisal, Aug. 1966, pp. 2-3 and 10.
[108] CIA/DIA Appraisal, Oct. 11, 1966, p. 8.

The overall conclusions of subsequent reports published through 1967 placed heavier emphasis on how bombing affected enemy military capabilities and contained the standard comment, "The cumulative effects of the US air strikes continue to limit the North Vietnamese capability for overt aggression, however, they retain the capability to continue to support activities in South Vietnam and Laos at present or increased combat levels and force structures."[109] The wording of the latter statement evolved over time. By September 1967, the additional comment, "However, the cumulative effects of the air strikes have degraded North Vietnam's capability for sustained large-scale conventional military operations against South Vietnam"[110] had appeared. Perhaps the analysts added the September 1967 comment just in case the additional target approvals that coincided with the August 1967 Stennis Committee hearings bore fruit. The Tet Offensive apparently led to another slight revision. The February and March 1968 Appraisals written against a Tet Offensive backdrop still said bombing had degraded the North's capacity for "sustained large-scale conventional military operations" in the South, but noted, "increased levels of combat and stepped-up infiltration of men and supplies" demonstrated an enemy ability to increase levels of combat.[111] The comments about limiting capacity for aggression and cumulatively reducing the capacity for large-scale military operations disappeared altogether in the June 1968 edition.

When reading the Appraisals, one has the impression the writers were skeptical about Rolling Thunder's prospects, but still wanted to be able to claim they had been right

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[109] CIA/DIA Appraisal. each issue examined dating from late 1966 through 1967.
[110] CIA/DIA Appraisal. Sep. 15. 1967. p. 10.

in case the bombing proved successful. The CIA/DIA analysts may no longer have felt the

need to hedge their conclusions by June 1968, but by that time their chance to shape

policy by making less ambiguous claims had long since passed.

Other statements also permit multiple interpretations. A September 1967 remark

that might superficially have seemed a strong sign of bombing effectiveness was actually a

lukewarm endorsement that said, "Virtually all modern industrial output has been halted

since June and it does not appear that North Vietnam will attempt major repairs to most

plants so long as the bombing continues at present levels."[112] Rather than implying

bombing had brought the economy to the verge of collapse, the report went on to suggest

that Hanoi was meeting industrial shortfalls through increased imports. The unstated

inference was that the industrial plant damage was irrelevant. A major 1966 effort to

destroy POL provided other chances for ambiguity. The 1966 Appraisals noted the

percentage of national POL capacity destroyed and the estimated POL quantities

imported, but were ambiguous about residual fuel supplies. References to fuel supplies

did not initially estimate the North's consumption rate, but reports written in 1967

incorporated a new metric expressing POL status in terms of how many days worth of

supplies were available assuming a given usage rate. A drop from a 120-day supply to a

60-day supply might seem an indication of excellent results, but the reports never

[111] CIA/DIA Appraisal. Feb. 29. 1968 and Jan 1 - Mar. 31. 1968. pp. 7 and 2. respectively.
[112] CIA/DIA Appraisal. Sept. 15. 1967. p. 11.

characterized the POL situation as a threat to the North's war effort. Comments such as

"No evidence of any shortage of POL has been noted" exemplified that outlook.[113]

The Appraisals influenced American decision-making. They definitely struck a

responsive chord in Secretary McNamara's mind and shaped his views about the

bombing's efficacy. When recalling his 1967 Stennis Committee testimony in his memoirs,

he defended his skeptical stance on expanding Rolling Thunder by saying,

> I pointed out that the regular monthly report "An Appraisal of the Bombing
> of North Vietnam," which was prepared jointly by the CIA and the Defense
> Intelligence Agency and distributed to all senior civilian and military
> officials right up to the president, invariably concluded with these words:
> "The stepped-up air campaign has caused major changes in the air defense
> system and widespread disruption of economic activities in North Vietnam.
> However, the North Vietnamese still retain the capability to support
> activities in South Vietnam and Laos at present or increased combat levels
> and force structures."[114]

The Appraisals also influenced military thinking. The previous discussion of

Seventh AF bombing assessment methods presented circumstantial evidence from General

Momyer's memoirs that he had used the CIA/DIA Appraisals to help gauge Rolling

Thunder's success.[115] At least one issue of PACOM's Rolling Thunder Digest also

included wording nearly identical to remarks made in an Appraisal published shortly

before that Digest issue.[116] Additional evidence of the Appraisals' influence on Air Force

assessments also exists. Air Force archives contain ten of the reports, some of which

include memos and annotations written by Gen. George Simler, a senior Air Staff officer

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[113] CIA/DIA Appraisal. Aug. 1966. p. 6.
[114] McNamara. p. 288.
[115] See Momyer. Air Power in Three Wars. pp. 232-233.
[116] Compare Rolling Thunder Digest. Oct. – Dec. 1966. p. 8 and CIA/DIA Appraisal. Oct. 1966. p. 9.

(and former 2ⁿᵈ AD Director of Operations). Air Force copies dated from October 1967

to March 1968 all have Gen. Simler's name and Pentagon office symbol (AFXOP)

handwritten on their cover pages. Stapled inside the October 1967 Appraisal is a

handwritten memo on Headquarters, USAF Office of the Director of Operations

letterhead signed by Simler.

General Simler also underlined and highlighted sections of the reports. Notations

he wrote in the margins suggest he was skeptical of what the Appraisals said and found

the repeated comment about how bombing's cumulative effects were reducing North

Vietnam's offensive military capabilities especially dubious. Next to the place where the

September 1967 Appraisal made the familiar statement about how bombing's cumulative

effects had degraded North Vietnam's capacity for large-scale military operations, Simler

wrote, "oft said but is it so."[117] He wrote "same ole story" next to the place where the

December 31, 1967 Appraisal made the standard cumulative effects remark.[118] Adjacent

to the place where the March 1968 report - written after the Tet Offensive - still said

bombing was degrading the North's capacity for sustained large-scale operations, Simler

wrote incredulously, "Tet was not a sustained large-scale mil opn?"[119]

General Simler also expressed doubts about how the CIA/DIA reports reached

their conclusions. Where the December 1967 report said MK-36 Destructor mines

dropped in waterways were inhibiting boat traffic, but characterized the evidence as

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[117] CIA/DIA Appraisal, Sept. 15, 1967, p. 10. USAF copy. The USAF copies are classified secret.
Declassified redacted copies are available at the Lyndon B. Johnson Library.
[118] CIA/DIA Appraisal. Dec. 31, 1967, p. 2. USAF copy.
[119] CIA/DIA Appraisal. Jan. 1 – Mar. 31. 1968, p. 2. USAF copy.

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fragmentary and circumstantial, Simler penciled in, "how do they know it's effective

then."[120] The general's annotations suggest he was personally doubtful both of the

campaign's overall efficacy and of the CIA/DIA's methods of reaching their pessimistic

conclusions. His previous 2nd AD experience should have made him qualified to evaluate

the analyses contained in the Appraisals, but if he did not think Rolling Thunder was

effective, his attitude was atypical of what most of his Air Force peers were saying.

Major General Robert Ginsburgh, a member of the JCS Chairman's staff and JCS

liaison officer to the White House, was also privy to CIA and DIA assessments. He did

not explicitly refer to the Appraisals, but was dissatisfied with the way the CIA and DIA

reports in general worded their overall conclusions. His proposed alternative wording

both assumed bombing was effective and shifted the burden of proving its effectiveness

away from the bombing itself. As Ginsburgh explained, CIA and DIA reports often said,

"we have no evidence to show that the military operations are having a significant effect

on the enemy. In many of these cases they could have equally as well phrased the

statement the reverse: we have no evidence to indicate that our military operations are not

being effective."[121] Ginsburgh's perspective was more typical than Simler's of the way

senior officers viewed national intelligence agency reports discounting Rolling Thunder's

effectiveness.

The extensive bombing data available to headquarters staffs and intel agencies did

not necessarily translate into useful conclusions. Senior officials who made the final

[120] CIA/DIA Appraisal. Dec. 31. 1967. p. 7. USAF copy.
[121] Maj. Gen. Robert N. Ginsburgh. OHI transcript. May 26. 1971. K239.0512-477. in USAF Collection.

judgments about Rolling Thunder's effectiveness found that interpreting the information was a very inexact science. Referring to the situation in 1965, the Pentagon Papers characterized intelligence assessments as "couched in such inexact and impressionistic language"[122] as to be of little use in determining how much the bombing pressured the North to reduce the insurgency or how it affected the North's ability to fight, noting,

> It was not easy to assess the contribution of ROLLING THUNDER to the war as a whole. Decision-makers like Secretary McNamara received regular monthly reports of measurable physical damage inflicted by the strikes, together with a verbal description of less readily quantifiable economic, military and political effects within NVN, but it was difficult to assess the significance of the results as reported or to relate them to the progress of the war in the South. Reports of this kind left it largely to the judgment or the imagination to decide what the bombing was contributing to the achievement of overall U.S. objectives.[123]

That comment may not have been referring to the CIA/DIA Appraisals, but uncertainty and ambiguity were effectiveness measurement hallmarks. Nevertheless, various agencies and individuals still strove to make sense of the data and deemed certain indicators especially meaningful. Much of the debate between contending military and civilian officials revolved around the proper way to ascribe meaning to those indicators.

AFHRA, pp. 6-7.
[122] Pentagon Papers, IV.C.7.(a), vol. I. p. 54.
[123] Pentagon Papers, IV.C.7.(a), vol. I, p. 52.

CHAPTER 5 - HEADQUARTERS ASSESSMENT: BASIC CRITERIA

The previous chapter described the methods various military headquarters and national intelligence agencies used to gather, process, and report bombing effectiveness information. Administrative procedures and publications reveal only a part of the dynamic process by which American policy makers evaluated Rolling Thunder. Additional insights emerge when one examines the categories into which policy makers organized bombing effectiveness information. A number of distinct yet interrelated criteria consistently cropped up when senior officials evaluated campaign. Some of those criteria have already been introduced during examinations of the CHECO Reports and other publications. Instead of describing how various organizations operated, the next few chapters will present a topically organized description of the bombing effectiveness criteria senior officials used. The discussion will begin with the relatively simple quantitative measurements most closely associated with first order effects and then gradually transition to the criteria used to gauge second and third order effectiveness. Contrasting civil-military opinions about bombing effectiveness will be a recurring theme.

Disused Criteria

Before describing what can be termed the basic effectiveness criteria senior officials did use, a few remarks regarding potential, yet seldom used, alternative criteria

are needed. Chapter 4 mentioned that headquarters officials rarely even mentioned enemy troops killed by bombing. Bombing was intended to destroy material things rather than kill people, and counting bodies from the air was impractical anyway, so body counts were not really a viable bombing effectiveness criterion. Bomb delivery accuracy, numbers of aircraft sorties flown, quantities of bombs dropped, and the financial cost of bombing compared to the financial value of targets destroyed were countable and might appear relevant to the campaign's success, but top officials de-emphasized those items.

Most people would expect accuracy to be a fundamental bombing effectiveness parameter. The Air Force has practically always advertised the virtues of precision bombing. Inaccurate "carpet" bombing implies an indiscriminate assault against civilian populations. Although such methods were used during World War II, the Air Force still officially strove for maximum accuracy. Nuclear weapons have been a partial exception, but comparing the warhead delivery accuracies achievable by different nuclear weapon systems has remained a standard effectiveness criterion.

Chapter 3 showed that USAF flying units seldom quantified their bombing accuracy. Qualitative judgments predominated and units merely distinguished between hitting and missing targets. A similar trend prevailed among senior military and civilian officials. Everyone understood bombs often missed targets. Fears of stray bombs killing civilians influenced the Johnson Administration's target approval decisions, and a later chapter will discuss in more depth how civilian casualties related to bombing effectiveness. However, bombing accuracy statistics are hard to find in statements or reports prepared by any Air Force agency. General Momyer told the Stennis Committee that one reason why

interdiction was succeeding was because "the bombing accuracy has gone up,"[1] but he did

not give any details. A few scattered references to the CEPs achieved by radar bombing

methods such as Combat Skyspot appeared in reports, but senior officials typically judged

accuracy by the same hit-or-miss criteria as flying units. For example, former 2nd AD

Commander General Moore once said of radar bombing, "I'm not sure just how accurate

it was. It was an area type of bombing, of course. … Just how accurate it was, was hard

to tell, because I don't think we had any way of sensing the misses or near misses."[2] Air

Force officials worried that stray bombs might increase civilian casualties, but showed

limited interest in quantifying miss distances or determining accuracy trends.

Even when ordnance hit with perfect accuracy, the first order results were not

always evident. A strike against the Hanoi Thermal Power Plant using TV-guided

Walleye bombs was a case in point. Major General Ginsburgh recalled that post strike

photos showed only a small hole in the generator building through which the bomb had

passed. There was no visible sign of whether the bomb had exploded or whether it had

destroyed the generator. Consequently, "there became a tremendous discussion of

whether or not the attack had been successful" until "collateral intelligence" obtained

"some days" later proved the power plant was out of action.[3] Accuracy was certainly no

guarantee of success. Rendering the generator inoperative defined success for that attack.

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[1] U.S. Congress, Senate, Committee on Armed Services, <u>Air War Against North Vietnam</u>, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 2, Aug. 16, 1967, pp. 168-169. (Cited hereafter as "Senate Preparedness Subcommittee.")

[2] Lt. Gen. Joseph H. Moore, OHI transcript, Nov. 22, 1969, K239.0512-241, in USAF Collection, AFHRA, p. 50.

[3] Maj. Gen. Robert N. Ginsburgh, OHI transcript, May 26, 1971, K239.0512-477, in USAF Collection,

Explaining the sparse references to accuracy is difficult. Chapter 3 speculated that flying unit personnel might have avoided the topic because poor accuracy might have raised the issue of bombs hitting civilian areas – particularly for fixed targets located near cities. Air Force senior officials may have preferred to discuss the amazing accuracy of precision weapons like the Walleye rather than the much less accurate bombs that comprised the overwhelming majority of ordnance used, but why administration officials did not often use bombing accuracy constraints to justify their graduated bombing policy and avoidance of urban targets is less clear. As a later chapter will explain, minimizing civilian casualties was a theme President Johnson and Secretary McNamara reiterated constantly. Perhaps the civilian casualty issue subsumed bombing accuracy as an important administration criterion for judging the campaign's success, but available evidence is insufficient to permit a firm conclusion.

One of the simplest and most widely used Rolling Thunder statistics was the number of sorties flown, but that does not mean anyone thought the numbers depicted effectiveness. Flying units reported how many sorties they flew, but Chapter 3 showed they did not regard sortie counts as bombing effectiveness indicators. Pilots who needed to fly 100 "counters" over the North to complete their combat tours had personal reasons for counting sorties, but regarded bombing effectiveness as a separate issue. Headquarters held more diverse views about how sortie counts related to effectiveness. Sortie counts attracted considerable attention, but hardly anyone made the simple contention that the

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AFHRA, p. 34.

campaign's success was revealed by or dependent upon the numbers of sorties flown.

Sortie statistics therefore told policy makers less about bombing effectiveness than might

at first be apparent.

The President wanted Rolling Thunder to apply carefully regulated pressure

against North Vietnam. Pressure was an abstract effect not subject to direct measurement,

so policy makers sought tangible metrics that seemed correlated with it. Missions

included widely varying numbers of sorties so sortie counts were a handier accounting

device than the potential alternative of counting missions flown. Sorties were a seductive

metric because they were readily quantifiable and apparently unambiguous, but not all

sorties were thought to apply equal pressure.

Air Force and Navy officials divided sorties into categories. Approximately half

the sorties flown bombed some kind of target while the other half performed supporting

functions such as air refueling or reconnaissance, but the precise dividing line between

sortie types was ambivalent and subject to change. The first editions of PACOM's Rolling

Thunder Digest published in 1966 divided sorties into two broad categories – attack and

combat air patrol (CAP). Attack sorties were subdivided into fixed target strike and

armed reconnaissance. Combat Air Patrol included rescue CAP (flown to fend off enemy

forces threatening rescue planes trying to retrieve downed flyers) and flak suppression in

addition to the regular kind of CAP flown to defend against MiGs. The first 1967 edition

of Rolling Thunder Digest reclassified flak suppression as attack sorties and the Digest

stopped tracking any sortie type except attack through the end of that year. The January

to March 1968 edition introduced a new sortie classification scheme dividing sorties into

combat and combat support categories. The revamped combat sortie category then consisted of strike, flak suppression, armed reconnaissance, CAP, and rescue CAP. Combat support included photo reconnaissance, electronic countermeasures, aerial refueling, airborne early warning, and "other" sorties. Interestingly, the April – June 1968 issue reverted back to the 1967 sortie classification format and the Digest retained it for the remainder of Rolling Thunder. The constantly shifting classification schemes complicate sortie count comparisons between different time periods.

However defined, attack sorties became a handy proxy for pressure because they symbolized political resolve. In a strict sense, sortie counts told nothing about effectiveness, but represented what was known in USAF parlance as the "weight of effort." Nevertheless, flying the proper number of sorties – however proper might be defined - could become an ersatz bombing effectiveness index.

The rate at which sorties flew became as important as the total number flown because more sorties per unit of time ostensibly meant more intense pressure was being applied. Statistics tracked sorties by intervals ranging from a day to a year, but monthly rates were a common standard. Monthly attack sortie rates varied considerably due to monsoon cycles, but tended to ratchet upward like a rising tide as the campaign progressed. Starting from a March 1965 rate of about 500, the monthly rate peaked at about 4,000 that September. After a 37-day pause in early 1966, monthly rates escalated from about 3,000 in February to over 12,000 in September. Sortie rates in 1967 began at about 6,000, peaked at about 12,000 during the summer and declined back to about 6,000 that fall. In 1968, sortie rates began at about 6,000 in January, fell to a February low of

about 3,000, then climbed to an all-time peak of over 14,000 in July before tapering off as

seasonal weather deteriorated and the campaign ended on November 1st. Annual totals

increased in proportion to average monthly rates. Different sources report slightly

differing numbers, but annual attack sortie totals were approximately 24,400 in 1965,

81,600 in 1966, 106,200 in 1967, and 92,500 through October 1968.[4] Of course, since

the definition of the term "attack sortie" varied, these numbers may not be strictly

comparable between different time periods.

The distribution of sorties between day and night was another time dimension

deemed related to effectiveness. Pacific Command reports explained how the North

Vietnamese penchant for traveling by night meant, "A continuing priority was the

distribution of attack sorties around-the-clock."[5] The reports added, "The extensive night

effort provides an around-the-clock pressure on the enemy logistics system"[6] as

interdiction methods like Night Owl and radar bombing demonstrated. However, most

sorties still flew during daylight even if most enemy movement happened at night, and

commanders were practically always required to limit strikes against important JCS fixed

targets to days with good weather.

The geographic distribution of attack sorties was another criterion air commanders

monitored, but they tracked percentages rather than numbers of sorties. Chapter 3

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[4] Data through Sep. 1968 are from Headquarters PACOM, Operations Division, Rolling Thunder Digest. Oct. 1968 data are from Headquarters PACAF, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, January 1967 – November 1968," Fig. 13. (Cited hereafter as "CHECO Report" followed by title.)
[5] Rolling Thunder Digest, Apr. – Jun. 1967, p. 16.
[6] Rolling Thunder Digest, Jul. – Sep. 1968, p. 31.

mentioned that some aircrews felt a combination of poor weather and Air Force – Navy

coordination problems diverted too many sorties to Route Package 1.[7] Headquarters

shared that concern and agreed that the leading sortie distribution problem was an

"overload" in RP 1 at the expense of the Hanoi – Haiphong area in RPs 6A and 6B. Both

PACOM and PACAF tracked sorties flown per route package and deemed certain

distributions better than others. They tracked RP 2, 3, 4, and 5 totals, but emphasized the

RP 1 vs. RP 6A/6B ratio. Distribution was heavily imbalanced in February 1966 when RP

1 absorbed 64% of all attack sorties while RPs 6A and 6B combined received only 6%. A

PACOM report characterized the June 1966 percentages of 36% in RP 1 and 19% in RPs

6A and 6B combined as "a better sortie distribution."[8] The headquarters deemed the

October 1967 percentages especially good when RP 1 received 41% and RPs 6A and 6B

combined received 36% of the month's attack sorties. When deteriorating northeast

monsoon weather in November and December of 1967 kept air strikes out of the northern

route packages, PACOM complained, "Since the majority of the vital targets are located

in RP's VIA and VIB, a decrease in effort in these combined areas results in reduction in

the effectiveness of the Rolling Thunder campaign."[9] In February 1968, extremely adverse

weather (and perhaps diversion of sorties to support heavy Tet Offensive ground fighting)

contributed to a 72% vs. 10% RP 1 to RP 6A/6B distribution. To relieve periodic RP 1

sortie overloads, CINCPAC authorized Seventh AF to fly armed reconnaissance in the

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[7] See Maj. Arvid N. Skogerboe, OHI transcript, Apr. 11, 1968, K239.0512-048, in USAF Collection, AFHRA, p. 6.
[8] Rolling Thunder Digest, Apr. – Jun. 1967, p. 5.
[9] Rolling Thunder Digest, Oct. – Dec. 1967, p. 5.

inland parts of Navy-controlled RPs 2, 3, and 4 as he did during a poor weather period in July and August 1966.[10] The Air Force and Navy routinely agreed upon similar sub-divisions of route packages whereby the Navy covered coastal areas and the Air Force covered inland areas.

Johnson Administration officials paid less attention than military leaders to categorizing sorties, but Secretary McNamara and other officials did regard sorties rates as a throttle to regulate the pressure being applied against Hanoi. Air Force officials criticized McNamara's supposed fixation on flying sorties even if those sorties did not carry full bomb loads. When munitions shortages in 1965 threatened to force sortie rate reductions, the Secretary insisted on flying sorties without full bomb loads if necessary. According to Gen. Meyers, "McNamara realized that if we shut down the sortie rate, the press would pick it up and would immediately tell the American public that we were short of bombs and couldn't fly. So we had to fly. We put one or two bombs on the airplanes and kept the sortie rate up where it was."[11] If munitions shortages really existed in 1965, they subsided as the campaign progressed.

McNamara did not simply equate sortie totals with bombing effectiveness, but thought pressure varied directly with sortie rate up to a point of diminishing returns beyond which each additional sortie's marginal utility declined. An illustration of his thinking appeared in a memo to the President in 1966 in which he said, "It follows that the marginal sorties -- probably the marginal 1,000 or even 5,000 sorties -- per month against

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[10] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 79.

the lines of communication no longer have a significant impact on the war."[12] Since nearly

all targets in RP 1 were LOC-related, McNamara's marginal utility concept bore some

similarity to military complaints about sortie overload in RP 1 except that he did not

advocate reallocating the excess sorties to other areas.

If more sorties did not lead to better results, the President acted as if fewer – or

even none - might work better under certain conditions. While seeking the optimum sortie

rate, the administration sometimes acted as if bombing's third order effectiveness varied

inversely with sortie count. Between May 1965 and January 1968, the President ordered

eight bombing pauses. One lasted 37 days, another 7 days, and a third lasted 5 days, but

all the rest lasted 2 days or less.

The administration officially claimed pauses demonstrated U.S. good will and

eagerness to negotiate, but neither the enemy nor the U.S. military viewed pauses

favorably. The North Vietnamese dismissed them as preludes to bombing escalation and

rejected all offers to negotiate. Air commanders believed pauses detracted from bombing

effectiveness. The JCS deemed them counterproductive even if followed up by increased

sortie rates and once commented, "our experiences with pauses in bombing and

resumption have not been happy ones."[13] Judged by their ability to coax concessions from

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[11] Gen. Gilbert Meyers, OHI transcript, May 27, 1970, K239.0512-282, in USAF Collection, AFHRA, p. 66.
[12] Memo, McNamara to President, Oct. 1966, in U.S. Department of Defense, United States - GVN Relations, (Washington, D.C.: Gov't Printing Office, 1972), IV.C.7.(a), vol. I, p. 164. (Cited hereafter as "Pentagon Papers.")
[13] Memo from JCS to McNamara, Oct. 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 166.

the enemy or pave the way for meaningful negotiations, pauses seemed no more effective than sortie rates beyond McNamara's hypothetical point of diminishing returns.

Whether sortie rates were increasing or decreasing, USAF leaders appeared to regard them as more of an administrative encumbrance than an effectiveness indicator. Prior to 1968, when the monthly rate peaked after bombing had been restricted to the southern panhandle, sortie rates seemed logically correlated with numbers of authorized targets. Failure either to fly the planned number of sorties or to strike all authorized targets was cause for worry among military leaders. During much of Rolling Thunder, the Johnson Administration mandated that approved targets had to be struck within a fixed period of time (one week beginning in March 1965, later lengthened to two weeks, then one month, and eventually no time limit). Additionally, the administration sometimes allowed only a limited sortie quota to certain targets. Air Force reports diligently recorded whether or not the Air Force and Navy had flown their weekly or monthly armed recce sortie "quotas." Sorties not flown one month were lost and could not be carried over into the next month.[14]

Sortie quotas added to the air commanders' psychological burdens. General Meyers, retired 2nd AD and Seventh AF Vice Commander, told the Stennis Committee that during good weather, the air commanders had no trouble flying the maximum allowed number of sorties, but bad weather often precluded flying all of them. Commanders worried that if fewer sorties were flown than authorized, political leaders would conclude

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[14] See CHECO Report, "Rolling Thunder, July 1965 – December 1966." Quotas mentioned throughout. Sortie carry-over ban mentioned on p. 37.

"you did not really need that many anyway" and reduce future sortie allocations.[15] He

later said his forces almost always managed to destroy the approved fixed targets "with

less sorties than they restricted us to," but still worried his sortie quota might shrink.[16]

The pressure to fly the sorties or risk losing them created a situation similar to the

one government agencies can face if they do not spend their entire budgets - they either

spend all the money or risk a budget cut the next year. The "use-them-or-lose-them"

sortie mentality may have contributed to cases where planes flew missions when there was

little chance weather would be good enough for accurate bombing. Sometimes,

commanders ordered extra planes into the air during good weather to compensate for days

when poor weather had grounded previous missions. General Meyers admitted during the

Stennis Committee hearings, "we used larger numbers of sorties to attack these targets

than we thought was militarily advisable based on the defenses that existed. This was

done so we would not lose sorties in the next allocation."[17] That remark is troubling

because extra sorties exposed more pilots and planes to enemy fire for bureaucratic rather

than military reasons. General Meyers' comment implied the USAF generals were more

worried about suffering sortie budget cuts than about risking higher casualties.

The "use-them-or-lose-them" attitude was not unanimous among military officials.

Furthermore, insufficient sortie approvals (like the alleged munitions shortages) may have

been a problem only early in the campaign. Although August 1967 was the time when

Gen. Meyers made his remark about having previously used extra sorties, Air Staff planner

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[15] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 479.
[16] Meyers, OHI transcript, p. 181.

Col. Edelen related how CINCPAC counteracted the problem of running out of sorties

before striking all authorized targets by deliberately requesting "more sorties than we were

ever able to fly." Edelen added, "I can't remember a case after the '65 difficulties when

CINCPAC was not able to fly to the extent of his capabilities."[18]

Commanders at least partially accepted the administration's belief that sorties

pressured the enemy. The northeast monsoon's low clouds often precluded visual

bombing from roughly October to March each year, but radar bombing techniques

permitted some attacks to continue, albeit with uncertain accuracy. Aircrews were

skeptical of radar bombing because BDA was difficult to obtain, but senior officers judged

success differently. A PACOM report noted about 30% of the December 1966 attack

sorties used radar bombing and, "Use of this method keeps pressure on the enemy despite

unfavorable weather."[19] An alternative terminology was to say radar bombing "enabled

U.S. aircraft to maintain 'presence' over NVN."[20] Commanders seldom cited applying

pressure as a reason to bomb during favorable weather, but did so more often when bad

weather interfered with flying. Pressure resulting from the number of sorties flown

seemed to be a success indicator commanders appropriated from administration rhetoric

and used when more concrete indicators such as visible damage were unavailable.

Like their subordinates in flying units, Air Force commanders did not use sortie

counts *per se* as a bombing effectiveness index or assert that effectiveness correlated

[17] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 486.
[18] Col. Henry H. Edelen, Jr., OHI transcript, Jan. 27, 1970, K239.0512-243, in USAF Collection, AFHRA, pp. 39 & 50.
[19] Rolling Thunder Digest, Oct. – Dec. 1966, p. 17. The Jan. – Mar. '67 edition contains similar remarks.

directly with sortie count. They clearly distinguished between the sorties' quantity and effectiveness. Except during bombing pauses or bad weather, the generals were usually satisfied with the aggregate number of sorties available, but questioned the way they were used. General Momyer, expressed this opinion when he said in 1967,

> I think, based on the size of the [air] forces that we have got right now, that we are operating at about maximum effort. And I do not believe ... putting additional [air] forces [in Southeast Asia] would significantly increase your disruption in the movement of men and supplies to the South. ... And the reason I say that is because of the number of lines of communication that you can work against, the availability of good weather, which you primarily need to work against the lines of communication and have the maximum effect.[21]

When asked about two weeks later to comment on Gen. Momyer's remark, Gen. Meyers replied, "We have adequate air resources available in the theater today to do the military job that has to be done in North Vietnam. ... Are these resources being utilized to the best extent possible to reduce the flow of men and supplies into South Vietnam? In my opinion, the answer is definitely no."[22]

Air Force leaders deemed total sortie rate statistics only one ingredient of effective bombing. Assuming adequate aircraft were available, they thought improved results depended as much on the types and numbers of targets attacked as on the number of sorties flown. The USAF also deemed McNamara's diminishing returns argument at least somewhat credible since a PACAF report asserted, "The weight of effort expended and the targets selected for destruction would determine the degree of effectiveness achieved.

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[20] Rolling Thunder Digest, Jan. – Mar. 1967, p. 13.
[21] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 132.
[22] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, pp. 488-489.

There was, however, a point of diminishing returns. The weight of effort, therefore, had to be carefully balanced against other facets of the campaign."[23] Previously mentioned concerns about geographic sortie distributions and not "overloading" RP 1 with too many sorties also showed USAF awareness that there was a point of diminishing returns.

The USAF believed that effective bombing required flying sorties at not less than a minimum threshold rate (which was impossible to define precisely). Once that rate was reached, increased sorties would not translate into proportionally greater results. An adequate sortie rate was a precondition for success, but did not depict bombing's relative success or failure. However, USAF definitions of proper rates and geographic distribution differed from McNamara's, and Air Force leaders were convinced that insufficient sorties or erratic oscillations between flying and pausing certainly were ineffective.

An attack sortie's purpose is to deliver munitions, so counting weapons dropped would seem a potential bombing effectiveness metric. Barring bomb shortages, the quantity of bombs dropped tends to vary directly with the number of attack sorties. Like sorties, bomb tonnages dropped express "weight of effort" (in a literal sense) rather than effectiveness, but have long been a familiar bombing campaign statistic. Accounts of American World War II strategic bombing campaigns typically mention how many tons of bombs U.S. aircraft dropped on Germany and Japan. Comparable tonnage data are available for Rolling Thunder, but practically nobody involved with the campaign characterized them as effectiveness indicators.

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[23] CHECO Report. "Rolling Thunder. July 1965 – December 1966." p. 28.

Combat squadrons and wings seldom advertised the ordnance quantities they had expended. When they did discuss the topic, unit members were sometimes boasting about destroying more targets with less ordnance. Air Force reports often mentioned bomb quantities dropped, but senior commanders displayed only a limited interest in the numbers. A PACAF description of the very first Rolling Thunder mission on March 2, 1965 listed the numbers and types of planes that flew, then noted, "The USAF strike force hit the Xom Bang ammo depot with a reported 70-80% damage by the 120 tons dropped."[24] The number of planes and the bomb tonnage dropped merely showed the operation's scale while the damage percentage described results.

Pacific Command's Rolling Thunder Digest and PACAF's CHECO Reports frequently mentioned bomb quantities expended. Each Digest edition discussed monthly operations highlights and featured numerous BDA photos. The narrative accompanying the photos would sometimes say how many planes had inflicted the damage and how many bombs they had dropped; however, most narratives made no mention of ordnance unless specialized weapons such as TV-guided Walleye bombs or MK-36 Destructor mines were involved. Walleyes were a cutting edge technology available in very limited numbers, and the Digest noted they had achieved direct hits an amazing 83 out of 91 times under combat conditions by the end of November 1967.[25] The MK-36 mines dropped in waterways – mostly by Navy planes – presumably impeded bridge repairs and boat traffic to some degree. Most Digest comments about mining told how many mines planes had

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[24] CHECO Report, "Rolling Thunder," (through mid-1965), p. 22.
[25] Rolling Thunder Digest, Oct. – Dec. 1967, p. 25.

seeded, but emphasized the difficulty of monitoring minefields and the lack of data about how much the mines were hampering travel. The remarks about the lack of data showed that the number of mines seeded did not translate directly into effectiveness. The An Appraisal of the Bombing of North Vietnam reports reiterated the mines' uncertain effects. The CHECO Reports often listed numbers and types of bombs expended, but only the July 1965 to December 1966 report included a graph of delivered ordnance tonnages per month. The other editions excluded the chart.

The performance of B-52s was one exceptional case where bomb quantities did seem to connote effectiveness, but the big bombers played only a small Rolling Thunder role and their operations were confined to the southern panhandle. For example, a PACAF report pointed out that B-52s had dropped over 600 tons of bombs on a mountain pass, but the road had evidently been repaired the next day.[26] The gist of the subsequent comments was not that B-52s were ineffective despite expending lavish quantities of bombs, but that the pass must have been important and should be bombed more often because the enemy was willing to exert such extraordinary efforts to keep it open.

Air Force references to bomb quantities sometimes implied that commanders were indifferent to judging results by ordnance amounts expended. Lieutenant Colonel Blackbird, a Seventh AF planner, noted how intel analysts meticulously consulted munitions effects tables to calculate exactly how many bombs of a given type were needed to achieve a specified target damage level only to have operational planners ignore their

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[26] CHECO Report. "Rolling Thunder. July 1965 - December 1966." p. 50.

calculations. He understood that numerous limiting factors ensured that bombing would not "actually achieve the kinds of damage levels one would expect from the munitions tables." Instead of assigning exactly the calculated number of planes to a target, commanders sent planes in flights of standardized sizes. Even if the optimum number of planes were sent, fusing problems might keep bombs from exploding as intended. Blackbird therefore concluded, "Our efforts to ... automate and put all this weapons data into our strike planning systems for field use is in severe doubt in my mind."[27]

Air Force officials were aware of munitions quantities, but the author found no instances where they said the campaign's success varied in proportion to the tonnages dropped. Perhaps, as they did with sortie rates, they believed a minimum threshold amount was a prerequisite to success, but did not think effectiveness depended on bomb tonnage dropped. Another possibility is that nobody was sure whether advertising a large or small tonnage figure was better. Emphasizing vast tonnages dropped without winning the war might make bombing seem ineffective. The tonnages were indeed large, so there was no way to cite the figures and describe Rolling Thunder as a small campaign.

The cost of enemy facilities destroyed versus the value of aircraft lost bombing them might seem to be an effectiveness ratio worth noting, but policy makers avoided using those data. Secretary McNamara did not volunteer cost information, but when specifically asked during Senate testimony, he said that by early 1967 the U.S. had destroyed about $180 million worth of enemy fixed targets while losing $911 million

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[27] Lt. Col. David P. Blackbird, OHI transcript, Nov. 6, 1969, K239.0512-302, in USAF Collection, AFHRA, pp. 30-32.

worth of aircraft.[28] The figures excluded operating costs such as fuel, spare parts, and ordnance. The financial cost ratio of about 5 to 1 seemed extremely unfavorable, but McNamara felt a more appropriate comparison was the number of U.S. lives lost versus the value of destroyed facilities. He did not offer a numerical value for each life, but seemed uncharacteristically ambivalent about statistical analyses based on financial costs.

The military rarely offered relative cost figures either. Air Staff Colonel Henry Edelen agreed bombing cost the U.S. more money than the North Vietnamese, but echoed McNamara's denial that money was a valid success indicator. Edelen said, "no war can be measured on a slide rule."[29] There seems little reason why either the administration or the military would want to advertise the fact that bombing cost the U.S. much more than the enemy and, indeed, neither group mentioned relative cost statistics very often.

Accuracy, sortie counts, bomb tonnages, and relative economic costs attracted only modest attention as signs of Rolling Thunder's effectiveness. The scant attention devoted to accuracy was surprising. Military and civilian leaders found sortie rates a convenient and popular metric, but tacitly agreed they were only peripherally correlated with effectiveness. De-emphasizing bomb tonnages and relative financial costs suggested those parameters were ambiguous success indicators. Unfortunately, American civilian and military leaders proved better able to agree about which criteria not to measure than about the ones they should measure.

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[28] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 283.
[29] Edelen, OHI transcript, p. 114.

Target Counting and Dueling Target Lists

Counting targets struck might seem conceptually akin to a disused effectiveness metric such as sortie counts, but target counting emerged as the most widely used basic bombing effectiveness criterion. Sorties were only a means to destroy targets, but first order target destruction seemed much more closely related to bombing's objectives. Flying unit members thought more destruction meant more effectiveness, so they tallied the trucks, buildings, and other items they destroyed or damaged. Commanders usually agreed with that view and established standardized lists to ensure that everyone involved in fragging, flying and assessing missions understood which targets were involved in each mission. The Johnson Administration held ultimate authority over target list development and exercised extremely close supervision over the procedures used to decide which targets could be struck and which were off limits.

Dividing missions into armed reconnaissance and fixed target strike categories had mixed implications for the role target lists played. Within approved armed reconnaissance route packages, any valid target was open to attack on sight so there was minimal need to obtain approval before bombing, but target lists still played a role in designating and describing targets. Seventh AF devised some lists of suspected truck parking areas, road intersections, minor bridges, and other interdiction choke points, but those lists were used mostly for simplifying communication with flying units. A mission might be fragged to fly in a given area and attack a specified backup target such as a truck park from a Seventh AF list before going home if no better targets such as vehicles were seen. Of course, crews were not at liberty to strike fixed targets within prohibited areas or facilities that had

been placed on the more formal target lists prepared by the JCS. The freedom to strike

most armed recce targets meant there was seldom any controversy surrounding the

numbers of items bombed except for understandable confusions such as deciding whether

a truck was destroyed or merely damaged and how many secondary explosions had

occurred. Intelligence staffs sorted out those issues, and commanders ordinarily accepted

whatever statistics and conclusions they developed. The problem of counting fixed targets

and assigning them to various lists happened on a higher level and was much more

politically complicated than tallying up how many armed recce targets had been struck.

Only a small percentage of Rolling Thunder sorties bombed fixed targets, but

counting those targets became a prominent effectiveness criterion. The generals

consistently sought approval to attack more fixed targets on the premise that the bombing

would thus become more effective. Air leaders acted as if the grass were always greener

inside the areas where bombing was prohibited and the campaign would bear fruit if those

unauthorized targets could be hit. A 1967 PACOM report anticipated that, "The

increased number of NVN targets authorized by RT [Rolling Thunder] 53 and 54 should

show quantifiable results in the near future. These new targets include the principal assets

of NVN's industrial capacity. ... This represents a positive step towards increasing the

pressure against the Hanoi regime."[30] A later report after the President had approved new

targets for RT-55 and 56 said, "Since the JCS designated targets represent the significant

war supporting targets in NVN, each new authorization represents a positive step towards

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[30] Rolling Thunder Digest. Jan. – Mar. 1967. pp. 9-10.

defeating the enemy."[31] When asked in 1970 how effective Rolling Thunder had been,

Maj. Gen. Gordon Blood, Seventh AF Deputy Chief of Staff for Operations from 1967 to

1969 replied, "within the Rules of Engagement, I think we were most effective because

during my tenure up to the cessation of the bombing in North Vietnam, I think we were

getting enough targets opened up to where we were having the maximum impact on North

Vietnam."[32]

Conflicts arose when administration and military figures disagreed about the lists

of approved targets. Tension revolved around statistics such as the numbers of targets

recommended but disapproved, authorized, struck, or authorized but not yet struck, but

placing fixed targets on lists and deciding if and when to bomb them was a tangled

bureaucratic procedure. As CINCPAC, Admiral Sharp could only recommend fixed

targets. He required Presidential authorization before his air units could strike them.

Seventh AF could then decide - within any administration imposed time, sortie, or other

limits —when and how to bomb those targets.

The JCS had already studied likely targets before Rolling Thunder even began, so

many of the target candidates were well known to air planners from the outset.

Reconnaissance and intelligence activities identified more potential targets as the campaign

unfolded. The challenge was to persuade the President to authorize attacks against

facilities air leaders wanted to strike. The Washington, DC authorization process was

cumbersome and usually began when Sharp submitted his recommended target list to the

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[31] Rolling Thunder Digest, Apr. – Jun. 1967, p. 5.

Pentagon. The Joint Chiefs of Staff reviewed CINCPAC's recommendations and often

deleted some targets or added their own new ones before forwarding their

recommendations to the Secretary of Defense, who in turn consulted with President

Johnson, who made the final decisions.

The President and Secretary of Defense used target lists as a lever to regulate the

pressure applied against the Hanoi leadership much as they controlled sortie rates. They

typically approved a few new targets each bombing cycle in accordance with their

graduated strategy. Depending on circumstances, they might add no new targets or else

they might suddenly approve a large number. Instead of approving individual fixed

targets, the President might move the latitude limits or otherwise redefine the geographic

boundaries within which armed reconnaissance was permissible. Expanded armed

reconnaissance areas would normally bring more targets of opportunity within reach.

Whatever prompted their approval, authorized targets remained valid for a limited

time during much of the campaign, so the military tried to attack them as soon as practical,

but adverse weather or other factors might allow some authorized targets to remain

unstruck for long periods. Synchronizing target approvals with the monsoon cycle would

have been militarily advantageous, but proved politically impractical. The existence of

authorized but unstruck targets allowed bombing critics to argue against authorizing more

targets. Air planners feared the same "use-them-or-lose-them" dilemma they faced when

they did not use up their sortie budget. If planes did not strike targets during the specified

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[32] Maj. Gen. Gordon F. Blood, OHI transcript, Apr. 6, 1970, K239.0512-257, in USAF Collection, AFHRA, p. 40.

time period, strike authority might expire and commanders would have to request it again. General Meyers worried that if they did not strike authorized targets in time, the military "would lose targets in the future, because they [the administration] could obviously justify it by saying, 'Well, you did not destroy those we gave you. … Why should we give you more?'"[33] The number of approved targets also influenced sortie distribution. Commanders thought any cut in the number of authorized fixed targets – especially in RP 6A or 6B - shifted sorties away from the lucrative fixed targets they wanted to hit and toward the already overloaded interdiction targets further south.

The military, administration, and Congress argued perpetually over how many recommended targets had been approved and struck, regarding that number as an important campaign barometer. The military wanted to strike more targets, the administration wanted to demonstrate restraint, and Congress occasionally tried to mediate between the two – such as during the 1967 Stennis Committee hearings. Unfortunately, counting targets was neither a straightforward task nor a simple index of the campaign's efficacy.

Competing target lists compiled by various agencies led to chronic confusion about the percentage of recommended fixed targets that had been struck. Lists tended to lengthen over time, adding more bewilderment. The initial JCS list the President disapproved in 1965 began with 94 targets, but had expanded to 236 by the end of that year. General Westmoreland developed another list of targets located within a few miles

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[33] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 491. See also Meyers, OHI transcript, p. 79.

of the South Vietnamese border that he deemed relevant to Army ground operations in the South. Early in the campaign, Seventh AF developed an Armed Recce Target List, which was later known as the Seventh AF Selection List. The Seventh AF lists were the ones used to help ensure - among other things – that units had a common basis for deciphering the correct road intersections, truck parks, or other interdiction targets the frag orders had assigned their armed recce missions. By mid-1967, CINCPAC maintained a list of 436 targets and the JCS list contained 242. The CINCPAC and JCS lists were eventually merged and 185 of the CINCPAC targets were added to the 242 from JCS to form a new 427-item entity called the operating target list - a database of facilities deemed militarily significant.[34] Yet another list, known as the Rolling Thunder Target List (RTTL) appeared in mid-1967 and also combined the JCS and CINCPAC lists. The RTTL gained ascendancy as the leading list. From the second half of 1967 onward, CINCPAC reports treated the RTTL as pivotal to operations since, "This single dynamic listing of the most significant targets (includes all JCS designated targets) serves as the priority strike list for all of PACOM [sic] units."[35] The Alpha Target List was a subset of the RTTL and included the most critical and politically sensitive targets – the vast majority of which were in Route Packages 6A and 6B. The number of Alpha targets varied, but was usually less than 100. Each strike against those targets was called an Alpha strike and required explicit approval from the highest government levels.

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[34] See Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, pp. 342-346.
[35] Rolling Thunder Digest, Jul. – Sep. 1967, p. 10. Also included in all subsequent editions.

Target lists categorized items in various ways. The initial 94-target JCS list

consisted of 82 fixed targets and 12 "armed recce segments."[36] The list classified fixed

targets by facility type and featured industrial plants, bridges, and other traditional air

power targets. The CINCPAC list assigned items to one of six categories: electricity, war

industries, transportation, military complexes, POL, and air defense. The RTTL was

organized along two dimensions, classifying targets both by type and by approval status.

The Rolling Thunder Target List's complexity and importance call for a more

detailed discussion than the other lists. The RTTL target types simply matched

CINCPAC's six target categories. The list's approval status structure assigned each

target to one of (initially) four appendices: Appendix 1, Authorized Priority Targets

which could be struck at any time without additional approval from JCS or CINCPAC;

Appendix 2, Unauthorized Priority Targets for which CINCPAC had to seek approval

before strikes; Appendix 3, Targets Under Consideration which were being reviewed –

some were under construction and others were recovering from previous strikes; and

Appendix 4, Unserviceable targets previously listed in Appendices 1, 2, or 3 which had

been destroyed and did not require restrike. On February 15, 1968, an Appendix 5,

Neutralized or Abandoned Targets was added to the RTTL. The new appendix included

targets previously listed in Appendix 4 that showed no evidence of enemy activity or

repair.[37] Individual targets were transferred between appendices based on BDA analyses

and political approvals. The RTTL included a total of over 400 entries, of which more

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[36] Edelen, OHI transcript, p. 29.

than half were in Appendices 4 and 5 by March 31, 1968.[38] The overall total gradually

increased as specific targets were added or deleted, reaching 465 by October 1968, just

before the campaign ended. High percentages in Appendices 4 and 5 might have implied

the U.S was running out of worthwhile targets, but commanders strove to increase the

numbers of items in Appendix 1, or at least in Appendix 2, albeit with decreasing success.

The RTTL brought some order to the target lists, but did not settle targeting

disputes. The target recommendation process never was very rational. Ideally, evolving

military conditions would have determined which targets were worth recommending at a

given time. Most JCS members who testified to the Stennis Committee denied basing

recommendations on anything but military considerations as circumscribed by the

administration's geographic boundaries. However, some observers suspected political

considerations intruded on military judgment when the JCS decided which of Admiral

Sharp's target recommendations to support and that the JCS "recommended targets ... on

the basis of what they thought would be approved, after previously there had been a

complete turndown of recommended targets."[39] Army Chief of Staff Gen. Harold Johnson

agreed with Senator Stuart Symington's assertion that "The reason quite a few of the

CINCPAC targets have been rejected by the Joint Chiefs of Staff is because you knew that

they did not conform to the broad overall policy of graduated response."[40] Colonel Henry

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[37] CHECO Report, "Rolling Thunder, January 1967 - November 1968," pp. 20-21. See Rolling Thunder Digest, Jan. – Mar. 1968, p. 23 for Appendix 5 information.
[38] Appendices 4 and 5 combined had 245 of the 456 RTTL items (about 54%) as of March 31. 1968. See CHECO Report, "Rolling Thunder, January 1967 – December 1968," p. 21.
[39] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 310.
[40] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 409.

Edelen, an Air Staff planner, did not testify in the Senate, but he stated during a later interview that the JCS did not always forward Admiral Sharp's recommendations because they knew the administration would disapprove targets in areas such as Haiphong.[41] Air Force commanders outside the Pentagon, such as retired Seventh AF Vice Commander Gen. Meyers, also admitted "we did not think it was a good strategy to keep needling them [higher officials] by asking to hit" targets unlikely to be approved.[42]

Whatever motivated recommendations, the number of targets authorized for attack was certainly the subject of intense political scrutiny. If they did refrain from recommending all the targets combat considerations dictated, the generals left themselves open to criticism from the administration they served. The target list status at the time of the August 1967 Stennis Committee hearings illustrated how Secretary McNamara skillfully used statistics to defuse Pentagon criticism of administration policy. At that time, the JCS was recommending attacks against 213 targets on its own list and 359 on the operating target list. McNamara pointed out that he had authorized strikes against 95% of the 213 recommended targets on the JCS list and 85% of the 359 recommended operating target list facilities, facts he said proved bombing was not subject to unreasonable political constraints.[43] Other Stennis Committee testimony referred to contemporary newspaper articles that reinforced McNamara's political position by claiming 95% of the targets on Gen. Westmoreland's list had been struck, so there was nothing left to bomb in the North. Westmoreland's targets along the DMZ were tactical

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[41] Edelen, OHI transcript, p. 11.
[42] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 485.

targets connected to Army ground fighting rather than Rolling Thunder targets *per se*,[44]

but the fact that nearly everything on one of the contending lists had been struck

strengthened the public's impression that the military was free to bomb practically every

desired target. Military complaints about bombing restrictions therefore seemed to be

mere quibbling. The numbers and percentages derived from target lists obscured the point

that vital facilities such as the Haiphong docks were numbered among the relatively few

disapproved targets, but the statistics did sound impressive.

Secretary McNamara combined statistics about the number of sorties flown with

the percentages of recommended targets authorized to portray the entire debate about

target approvals as a tempest in a teapot. He pointed out that armed reconnaissance

sorties outnumbered fixed target sorties by a wide margin and since only about 10% of the

bombing in North Vietnam was directed at fixed targets - the vast majority of which the

President had approved for attack - the controversy and confusion surrounding different

target lists actually involved only a few percent of the total bombing sorties flown.[45] The

difference between what the military requested and the President approved was therefore

very slight, so military complaints about target restrictions were unfounded - especially

since the JCS Chairman himself testified before the Senate that "our bombing campaign as

now visualized is going along quite well."[46] The approved bombing program would

presumably yield results nearly identical to the slightly expanded program the military

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[43] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, pp. 278, 294, and 320-321.
[44] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, pp. 337-339, 342.
[45] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 323.
[46] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 142.

wanted. If bombing practically every desired target did not achieve Rolling Thunder's objectives, bombing a few more would not make much difference. McNamara's argument implied the debatable tenet that each disapproved target was no more militarily significant than the approved ones, but military commanders were hard pressed to refute his rhetoric.

The intense emphasis on target lists did little to help officials comprehend how well bombing was fulfilling its intended purposes. One adverse effect of the wrangling was to obscure how the administration's target selection policies either stagnated or abruptly shifted over time. Political and psychological considerations dominated target selection at first, but military considerations - especially interdiction – later became increasingly important. Nevertheless, random events unrelated to political or military conditions could drastically affect targeting. General Gilbert Meyers recalled a period in 1965 when no new targets were approved for a long time. Second AD kept striking the same targets repeatedly even though they had been almost obliterated. When Meyers later asked JCS Chairman Gen. Earle Wheeler why no new targets had been forthcoming, Wheeler told him the President had had an operation and had been too ill to review any new target recommendations.[47] Meyers lamented, "We still had to keep our force in the air so that the press wouldn't find out that they were standing down."[48] Meanwhile, aircrews were risking their lives for only meager military gains.

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[47] The episode to which Meyers was likely referring was a period of several weeks in late 1965 when the President convalesced from gall bladder surgery. See Robert S. McNamara with Brian VanDenMark, In Retrospect: The Tragedy and Lessons of Vietnam, (New York: Times Books, 1995), p. 220.

[48] Meyers, OHI transcript, p. 19.

Domestic political exigencies could also induce sudden targeting changes. The same day the August 1967 Stennis Committee hearings began, the President suddenly approved 16 new fixed targets, only 5 of which the JCS had previously even recommended. According to an Air Staff officer, the JCS had not bothered to request the other 11 because they were closer to the Chinese border, Hanoi, or Haiphong than other disapproved targets. That officer concluded, "I think that these hearings definitely resulted in a change of direction on the part of the Secretary of Defense and it was as a result of these hearings that a number of targets were approved."[49] Admiral Sharp later wrote, "It was indeed no mere coincidence of timing that we had that very morning [when the Stennis Committee hearings began] finally received permission to strike various targets I had been asking to hit for months. It was obvious to me that the Secretary of Defense had hoped to spike my guns by granting these new targets right before I was to testify."[50]

Whichever factors influenced their choices, the President and his closest advisors initially viewed targets as discrete and interchangeable commodities the destruction of which would convey political messages rather than degrade the overall enemy war effort. The President often approved targets such as bridges with little regard for their military significance or geographic relation to other targets. The American Ambassador to South Vietnam (and former Army general) Maxwell Taylor even thought the President was overemphasizing military results in judging bombing effectiveness. Taylor complained early in 1965 that, "I have the impression that we may be attaching too much importance

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[49] Edelen, OHI transcript, pp. 79-81.
[50] Adm. U. S. G. Sharp. Strategy for Defeat: Vietnam in Retrospect. (Novato, CA: Presidio Press, 1978).

to striking target 40 [Phu Qui ammunition depot] because of its intrinsic military value as a target. If we support the thesis (as I do) that the really important target is the will of the leaders in Hanoi, virtually any target North of the 19th parallel will convey the necessary message ... as well as target 40."[51] Secretary McNamara expressed similar views in a memorandum written after Flaming Dart strikes flown a couple weeks before Rolling Thunder started. He noted that the strikes had destroyed or damaged only 69 out of the 491 military barracks buildings in the target areas yet, "Although the four missions left the operations at the targets relatively unimpaired, I am quite satisfied with the results. Our primary objective, of course, was to communicate our political resolve. This I believe we did. Future communications of resolve, however, will carry a hollow ring unless we accomplish more military damage than we have to date."[52] McNamara was leaving open the possibility of escalating bombing in accordance with the administration's graduated strategy. As Rolling Thunder continued, military effectiveness gradually became a more important target selection criterion for the Johnson Administration.

Air commanders were much quicker than the administration to emphasize a target's military value over its political value. When Gen. Meyers sought approval to strike all the bridges along a specific route rather than ones scattered along unconnected routes so he could pick bridges based on operational factors, the President refused. As bombing advanced northwards in 1965, Meyers complained that many of the JCS targets approved for attack were what he called "targets of imagination." He said aerial photos

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p. 194.
[51] Message, Amb. Taylor to Sec. of State, Mar. 13, 1965, Pentagon Papers, IV.C.3, p. 69.

showed most barracks and ammunition depots were abandoned, but the JCS "had to find

targets within that [area approved for bombing], and they picked the best things, I guess,

that they could within that area, or the best military targets." Meyers recalled,

> In our photos that we took on a day-to-day basis, we could never find any
> activity around them. And yet these became targets because they were
> military structures, and they were within the line that the President wanted
> to bomb at that time – so those were what we had to hit. ... They had
> photo interpreters in Washington, the same as we had; and we sent copies
> of every photo we took back there. ... Everybody in the military structure
> from Saigon to the Pentagon knew that these were not valid targets from
> the standpoint of what we consider targets.[53]

Major General Rockly Triantafellu, 2nd AD Chief of Intel during Meyers' tenure,

agreed that the barracks and ammunition depots approved during Rolling Thunder's early

period had been abandoned before bombing had even begun.[54] An Air Staff officer

remarked, "you had to hit something important that's south of that magic latitude."[55]

Arguing over different target lists and percentages of targets struck risked

obscuring other targeting criteria related to achieving desired results. Designing a

bombing program necessarily involves estimation and guesswork, but saying bombing

would be more effective if a higher percentage of desired targets were struck is clearly

simplistic. Excessive emphasis on lists may also have confused efforts to decide how

much damage was enough. Treating targets as numbers suggested each was a commodity

equally important and worth destroying. Not all targets were equally vital to the enemy

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[52] Memo, McNamara to JCS Chairman, Feb. 17, 1965, Pentagon Papers, IV.C.3, p. 64.

[53] Meyers, OHI transcript, pp. 103-105.

[54] Maj. Gen. Rockly Triantafellu, OHI transcript, May 3, 1971, K239.0512-485, in USAF Collection, AFHRA, p. 11.

[55] Edelen, OHI transcript, pp. 20-21.

war effort, and their relative values fluctuated in ways that were not always evident.

Trying to decide which were most important at a given time and how much damage to be

inflict upon them demanded detailed knowledge of enemy plans and dispositions that was

rarely available. Assuming the key targets could ever be identified, destroying only those

few targets might prove better than bombing all the wrong ones - at least in theory.

Military officials recognized those problems and tried to compensate. They often

portrayed individual targets as components of larger interrelated systems and viewed

target lists as indirect tools to gain gradual approval to attack those systems. One report

defined target damage as "that amount of damage which neutralizes or renders the target

ineffective and/or unable to perform its function."[56] Documents like the RTTL tried to

integrated targets' importance and degrees of functionality. Functionality can mean more

than just the physical condition of a single target. Seeking to disrupt functionality

suggests effects beyond first order damage to a single facility and can mean disrupting the

relationship between that target and related facilities. Unfortunately, arguing about

individual items on target lists frequently overshadowed attempts to understand targets in

second order terms as parts of larger systems to be influenced.

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[56] CHECO Report, "Rolling Thunder, July 1965 – December 1966," pp. 15 and 43.

CHAPTER 6 - HEADQUARTERS ASSESSMENT: SYSTEMS-ORIENTED CRITERIA

Viewing the enemy as a system of interrelated components offered a potentially broader insight into target selection and result assessment than looking at targets as separate items. Target counting was mostly a first order process. By studying the relationships between targets, systems-oriented assessment criteria reflected a more macroscopic perspective of bombing's second order results.

Attempts to understand bombing's effects on key North Vietnamese systems were common during Rolling Thunder, and policy makers made remarks consistent with such a perspective. Military leaders viewed Admiral Sharp's six target categories as elements of a larger national system that needed to be affected as a whole. The admiral wanted to "strike targets in all systems, instead of concentrating on just one system"[1] in order to cause maximum disruption, but he did not advocate striking only a few targets in every system. Major General Ginsburgh noted that the Johnson Administration's unfortunate habit of approving a sprinkling of unrelated facilities instead of concentrating on a particular target system "resulted in the dispersion of your effort, which is obviously not the most effective way to use airpower."[2] General Johnson's comments that targets

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[1] U.S. Congress, Senate, Committee on Armed Services, <u>Air War Against North Vietnam</u>, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 1, Aug. 9, 1967, pp. 24-25. See also pp. 32-33 and 93. (Cited herein as "Senate Preparedness Subcommittee.")
[2] Maj. Gen. Robert N. Ginsburgh, OHI transcript, May 26, 1971, K239.0512-477, in USAF Collection, AFHRA, p. 41.

should be evaluated "not from the point of view of the importance of each single target by itself, but from the point of view of the importance of the package of targets to the total effort" and that "the focus that has been made on individual targets at the expense of a concentration on target systems has not been a useful focus"[3] also indicated a systems view of targeting. Given Rolling Thunder's objective of preventing infiltration, the most prominent target system was North Vietnam's transportation network of roads, railroads, and waterways. Fuel supplies emerged as a closely related secondary target system.

A systems approach may not have led planners to the perfect target list, but was probably superior to viewing raw numbers of targets approved for attack or percentages of targets struck as valid effectiveness indicators. However, senior officers proved willing to settle for practically any new targets the administration authorized and gladly accepted the opportunity to bomb individual targets that offered little prospect of disrupting an important system.

Transportation and POL

North Vietnam's transportation network was an early example of a target set civilian and military officials viewed as a system. The Johnson Administration's growing emphasis on selecting targets calculated to damage enemy military capabilities rather than merely to signal resolve contributed to an increased interest in interdiction. Reducing infiltration was a key objective, so interdicting southbound transportation routes seemed

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[3] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, pp. 402 and 398. See also p. 415.

an ideal way to counter the most blatant manifestation of Hanoi's war effort with less risk than potentially provocative alternatives such as bombing Haiphong harbor. Politically, attacks against remote bridges and truck parks appeared more plausibly related to stated U.S. objectives than attacks against factories or harbors and had the added bonus of minimizing civilian casualties. Emphasis on interdiction may also have helped deflect public attention away from controversial actions such as deploying ground troops and bombing industrial plants located in populated areas. The military chiefs found a point of agreement with the administration and began preparing for strikes against key highway and railroad bridges in North Vietnam. Pacific Air Forces Headquarters began a continuous, methodical LOC activity analysis that sought to estimate the transportation system's capacity, find weak links, and determine how to exploit those weaknesses.

The 1966 decision to attack POL facilities was closely entwined with attacks against transportation networks and was another example of a systems approach to targeting. Destroying fuel supplies seemed a plausible way to achieve the second order effect of interdicting transportation, and Admiral Sharp had long advocated POL strikes as part of his six target system concept. Air commanders might ordinarily have urged attacks against POL as part of a strategic bombing campaign to disrupt the enemy's industrial economy, but embraced the campaign's interdiction potential with comparable enthusiasm.

Numerous studies and reports by military agencies substantiated the linkage between POL and interdiction. As a late 1965 JCS study explained, "the interdiction of rail lines … has resulted in the need to move increased tonnages by alternate means, primarily trucks and motor driven water craft. Thus, the most effective way to compound

the current interdiction of DRV LOCs, and to offset the introduction and use of substitute modes and routes, is to reduce drastically the available supply of POL."[4] Pacific Air Forces deemed the POL system an especially lucrative target because "The destruction of POL supplies could be achieved with a relatively low sortie rate" and "would have a greater impact on NVN ability to move men and materials than any other effort."[5] Some findings about the balance between enemy fuel consumption and storage capacity did temper the military's enthusiasm, however. A November 1965 JCS/DIA study noted that North Vietnam used about 32,000 metric tons of POL per year, but had about 179,000 metric tons in storage, meaning any attack would need to be devastating to cause shortages and yield significant interdiction benefits.[6] The North Vietnamese had also been expanding their storage capacity and dispersing stockpiles since bombing began.

Non-military intelligence agencies held divided views about attacking POL. A March 1966 CIA study endorsed JCS proposals to intensify bombing against most targets, but particularly urged striking POL because "the principle of concentration" might be applied, meaning enough of the system could be attacked simultaneously from the air to deplete excess capacity and overwhelm repair and dispersal efforts.[7] However, special reports prepared by the Board of National Estimates at Secretary McNamara's behest were less sanguine, suggesting, "We believe that the DRV is prepared to accept for some

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[4] JCS memo, Nov. 1965, in U.S. Department of Defense, United States - GVN Relations, (Washington, D.C.: Gov't Printing Office, 1972), IV.C.7.(a), vol. I, p. 66. (Cited hereafter as "Pentagon Papers.")
[5] Headquarters PACOM, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, July 1965 - December 1966," p. 27. (Cited hereafter as "CHECO Report" followed by title.)
[6] Pentagon Papers, IV.C.7.(a), vol. I, pp. 73-74.
[7] CIA report, Mar. 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 83.

time at least the strains and difficulties which loss of the major POL facilities would mean

for its military and economic activity. It is unlikely that this loss would cripple the

Communist military operations in the South, though it would certainly embarrass them."[8]

The meaning of the term "embarrass" was unclear so the remark seemed another example

of the "inexact and impressionistic language" seen in so many intelligence reports.[9]

Regardless of the mixed intel findings, the Air Force may have had political, as

well as military, motives to advocate POL attacks. Pacific Air Forces commander General

John Ryan noted, "The results of this mission [a planned POL strike in Hanoi] could

dictate whether authorization would be granted to hit other worthwhile targets in the

Hanoi area." Ryan therefore recommended "successive flights, if necessary, to achieve

high levels of destruction on Target 49 [JCS target list number for the Hanoi POL storage

site] which would be the focus of attention in Washington."[10] The Hanoi site contained

17% of North Vietnam's total storage capacity - less than half the 36% at the Haiphong

POL site that was also scheduled for attack – making Target 49 only the second largest

POL target, but the Air Force was primarily responsible for striking the inland Hanoi site,

while the Navy was primarily responsible for the coastal Haiphong site. Achieving high

visibility in Washington political circles and disrupting the enemy war effort appeared to

be coequal marks of effective bombing. Colonel Henry Edelen, an Air Staff planner, also

saw the POL system approval as possibly leading to additional target system approvals.

He said, "The fact that we were able to sell the POL system made us feel that perhaps the

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[8] Board of Nat'l Estimates reports, Nov. 27 and Dec. 3, 1965, Pentagon Papers, IV.C.7.(a), vol. I, p. 68.
[9] The phrase comes from Pentagon Papers, IV.C.7.(a), vol. I, p. 54.

next thing would be to sell the thermal [electrical] power system," which, along with the

steel and cement plants, had been on the original 94-target JCS list.[11]

The POL operation's expected high political visibility also influenced BDA plans.

Anticipating "extraordinary demands for information," the JCS requested "that every

means be taken to secure good, prompt BDA of targets struck" and urged Seventh AF to

send all post strike reports and evaluations to PACAF as quickly as possible. The JCS

wanted strike and recce aircraft to make "full film coverage" of the attacks and wanted the

developed images expedited to Washington aboard jet aircraft.[12]

Most planners expected a long time lag between a POL campaign's first and

second order effects. Conventional wisdom held that fuel shortages resulting from

successful strikes would not immediately manifest themselves in reduced enemy vehicle

traffic because fuel in dispersed storage would form a buffer allowing enemy

transportation activity to continue for some time. Walt Rostow, just after becoming the

President's National Security Advisor on April 1, 1966, advanced a much more optimistic

forecast of how soon POL strikes would hinder enemy movements. He used World War

II experience as a basis for expecting relatively prompt second order results after a POL

campaign despite the North's considerable storage capacity. Rostow acknowledged the

danger of relying on historical analogies, but said that during World War II, enemy air and

tank activity decreased as soon as "serious and systematic" oil attacks began because

[10] CHECO Report, "Rolling Thunder, July 1965 - December 1967," p. 62.
[11] Col. Henry H. Edelen, Jr., OHI transcript, Jan. 27, 1970, K239.0512-243, in USAF Collection, AFHRA, p. 57.
[12] CHECO Report, "Rolling Thunder, July 1965 - December 1966," pp. 61-62.

it proved much more difficult, in the face of general oil shortage, to allocate from less important to more important uses than the simple arithmetic of the problem would suggest. Oil moves in various logistical channels from central sources. When the central sources begin to dry up the effects proved fairly prompt and widespread. What look like reserves statistically are rather inflexible commitments to logistical pipelines. … it is quite possible the military effects of a systematic and sustained bombing of POL in North Vietnam may be more prompt and direct than conventional intelligence analysis would suggest. I would underline, however, the adjectives 'systematic and sustained.' If we take this step we must cut clean through the POL system -- and hold the cut -- if we are looking for decisive results.[13]

Nagging doubts delayed President Johnson's decision to order the POL strikes. The link between POL and infiltration may have been clear based on transportation system analyses, but seemed politically tenuous. The President feared the attacks might create the impression the U.S. was escalating to all-out bombing and was going beyond the officially proclaimed policy of striking only military targets directly related to infiltration. Some advisors feared POL strikes might mark a symbolic step that would trigger Chinese or Soviet entry into the war. The targets' proximity to populated areas threatened severe political repercussions if the attacks caused heavy civilian casualties.

Limiting civilian casualties and damage to civilian areas near POL targets (often called collateral damage) seemed almost as important a measure of the operation's success as reducing infiltration. Secretary McNamara informed CINCPAC the "Final decision for or against [POL strikes] will be influenced by extent they can be carried out without significant civilian casualties."[14] Admiral Sharp therefore proposed methods of reducing

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[13] Rostow memo to Sec. of State Rusk and Sec. of Defense McNamara, May 6, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 119.
[14] McNamara message to CINCPAC, Jun. 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 124.

collateral damage to the absolute minimum. The Air Staff had recently suggested using only the most experienced pilots, briefing them thoroughly, flying only during clear weather, making maximum use of sophisticated navigation aids, and selecting weapons for pinpoint accuracy rather than wide area coverage. Hoping to minimize pilot distractions during bombing and improve the chances for precise hits, Sharp reiterated the Air Staff recommendations and added plans for extensive Electronic Countermeasures (ECM) support to suppress defenses. He also noted that North Vietnam's excellent air raid warning system give civilians plenty of time to take cover. The order approving the attacks stipulated that all those precautions be taken and also added the requirement to "limit SAM and AAA suppression to sites located outside populated areas"[15] in order to further reduce the risk of killing civilians. Defense suppression normally entailed bombing and strafing missile and gun sites in addition to employing ECM, but the administration was willing to countenance heavier aircraft losses to minimize risks to enemy civilians.

The POL campaign finally launched was a relatively systematic assault against one of Admiral Sharp's target categories, but the President did not approve all requested fuel targets. The operation illustrated some ambiguities of measuring bombing effectiveness against systems. First order destruction of POL facilities would be visually spectacular due to massive explosions and fires. Hopefully, civilian casualties would be far less spectacular. Rapid destruction of an impressive percentage of the North's fuel supplies and storage capacity seemed likely. However, linking the effort so explicitly to

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[15] POL attack execute message, Jun. 24, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 126.

interdiction made the second order effect of reducing infiltration the primary standard for judging success. Hopes of a short time lag between the attacks and vehicle traffic reductions led U.S. leaders to expect prompt, measurable interdiction results.

Bombing began briskly in late June 1966 and seemed to have achieved spectacular first order results. An Air Force report claimed that three days of Air Force and Navy raids against Hanoi and Haiphong POL facilities from June 29 - July 1, 1966 had destroyed an estimated 2/3 of North Vietnam's total storage capacity.[16] The DIA reported lower estimates and thought about 59.9% of the total storage capacity had been destroyed by July 20th. After a month of bombing, DIA estimated 75,000 tons of capacity remained undestroyed - 2/3 of which was still off limits because it was stored at airfields disapproved for attack.[17]

Although curbing transportation by destroying fuel supplies was a widely accepted POL campaign justification, agreeing upon BDA metrics acceptable to all the intel agencies proved surprisingly difficult. Pacific Air Forces maintained "elaborate figures" about the POL strikes and continuously reported them to CINCPAC, the DIA, and the JCS, but the agencies disagreed about which statistics were most relevant.[18] The JCS, DIA, and CIA viewed a POL target's potential storage capacity as the most important parameter, but PACAF thought the residual POL actually present was more important. The conclusions suggested by the two measurements could be drastically different. Pacific Air Forces estimated the Viet Tri POL site had been nearly obliterated and contained only

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[16] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 64.
[17] Pentagon Papers, IV.C.7.(a), vol. I, p. 141.

325 metric tons (MT) of residual POL, but DIA concluded the target was not yet destroyed and still retained a 1,320 MT storage capacity. An Air Force report said, "The problem remained essentially one of destroying POL capacity or giving convincing proof of the lack of POL residual."[19] Unless the experts reached agreement, decision-makers were uncertain whether the targets required additional attacks. Pacific Air Forces may have hoped to declare the sites destroyed and then move on to new targets. To resolve the BDA discrepancies, PACAF told Seventh AF to obtain high-resolution photos so the target's actual residual value could be determined. The PACAF and DIA representatives eventually agreed the Viet Tri site had been virtually destroyed and warranted no further strikes unless surveillance showed it had been repaired. The agencies apparently devised other ways to depict POL results, and the changing metrics manifested themselves in the CIA/DIA An Appraisal of the Bombing of North Vietnam reports. The 1966 editions included charts of POL capacity, but not of residual quantities. By 1967, reports expressed POL status in terms of how many days worth of supplies were available assuming a given usage rate.[20]

Additional measurement confusion arose when analysts began broadening the definition of a POL facility to include marginally related items such as truck parks and military storage areas. Lieutenant Colonel Blackbird, a Seventh AF planner, thought the epitome of calling everything a POL target was when a briefer described a river crossing point as a "ford/dispersed POL target." Blackbird sardonically commented, "And this of

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[18] Col. Pat E. Goforth, OHI transcript, Jan. 5, 1970, K239.0512-391, in USAF Collection, AFHRA, p. 19.
[19] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 85.

course, was the game we played with statistics in order to convince the higher ups along the line that we were, indeed, engaged in destroying all the POL in North Vietnam."[21] Labeling everything a POL target reached such proportions that Admiral Sharp finally instructed analysts to "avoid indiscriminate reporting" of POL damage whenever bombing caused fires or explosions attributable to other sources and "to develop rigid criteria for identifying facilities as being predominately POL."[22]

As previously mentioned, senior commanders hoped the POL campaign would serve as a springboard to attacking North Vietnamese industrial and transportation systems. Perhaps sensing a chance to capitalize on apparent initial success, General Ryan and Admiral Sharp requested authority to strike a wide assortment of steel, electricity, transportation, and other long-sought targets soon after the spectacular initial POL attacks. Admiral Sharp especially urged strikes against the Thai Nguyen steel plant because that facility made fuel tanks used to disperse POL supplies, trusses and pontoon sections used for bridge repairs, as well as barges and other watercraft. If interdiction were indeed the POL campaign's purpose, Sharp contended the steel plant was a critical node in the North's transportation system and was therefore another good interdiction target. Practically any target might arguably support the North Vietnamese transportation system in some manner. However, hopes of using a successful POL effort as leverage to gain approval for the larger bombing campaign the military wanted did not materialize.

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[20] See Chapter 4.
[21] Lt. Col. David P. Blackbird, OHI transcript, Nov. 6, 1969, K239.0512-302, in USAF Collection, AFHRA, p. 30.
[22] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 86.

Military leaders advocated attacking everything associated with interdiction, but the administration demurred, seemingly viewing the POL program as a sequential step to be completed before moving on to another phase.

Heavy POL strikes continued for weeks, but second order results were increasingly disappointing. Practically all the large petroleum-handling infrastructure was destroyed, but the expected curtailment of enemy truck traffic did not ensue. The Vietnamese kept establishing numerous small, hidden fuel storage sites, and continued bombing yielded diminishing results because as a PACAF report noted, "new dispersed storage capacity was being discovered at a rate which approximated the rate of destruction."[23] The surviving fuel capacity provided a comfortable margin above requirements and unrestricted imports through Haiphong compensated for losses. Dispersed storage was relatively invulnerable, and attempts to destroy it meant rising U.S. costs in fuel, munitions, aircraft, and pilots. The operation bogged down.

Nevertheless, the PACAF Director of Targets felt the Air Force had no alternative but to continue the attacks. Colonel Goforth knew "the results began to diminish after several months," but completing the destruction of the POL system seemed a prerequisite to obtaining additional target approvals. The confusion over defining success by storage capacity destroyed or actual oil quantities destroyed affected how the Air Force performed the campaign. Goforth later remarked,

> Analysis of the situation and of the targets indicated that the most effective
> way to comply with the letter of the directive [to strike POL] and yet strike

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[23] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 79.

other lucrative targets was to continue the campaign beyond the point of feasibility by destroying capacity rather than actual POL stocks. It was necessary to demonstrate destruction of almost all of the storage capacity before authorization could be obtained to shift the focus of the air campaign over Route Package VI to a more lucrative target system.[24]

Although PACAF and other agencies had ostensibly agreed upon POL strike assessment criteria, lingering doubts about whether capacity or actual residual supply was the truest measure of the campaign's first order success may still have persuaded USAF commanders that they needed to destroy storage capacity before political leaders would deem the campaign complete and approve other target systems.

As the months passed, some top officials began to believe that, however convincing the theories about reducing infiltration by cutting off oil may have been, those theories had failed in practice. Bombing fuel supplies had inflicted extensive first order physical damage, but appeared ineffective in interdiction terms. Secretary McNamara pessimistically concluded in 1967 that "the campaign to destroy the petroleum system ... which was thought would have a significant effect on the movement of men and materiel from [sic] the south has had no effect on it for all practical purposes."[25] McNamara's appraisal might have reinforced a growing suspicion that military commanders could not deliver the bombing results they kept promising if given a freer rein. Former National Security Advisor McGeorge Bundy had voiced similar concerns earlier in 1967 when he

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[24] Goforth, OHI transcript, p. 19.
[25] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 307.

asked, "Remembering the claims made for attacks on oil supplies, should we not be very skeptical of new promises?"[26]

Air leaders conceded the POL campaign had not achieved its original purpose, but still saw reasons to consider it successful. Although fuel shortages did not curtail enemy truck movements, Admiral Sharp thought the campaign had forced the North Vietnamese to divert "an awful lot of manpower" to building dispersed fuel storage sites.[27] Major General Triantafellu, former 2nd AD Chief of Intel, later characterized the attacks as "our first good opportunity to attack a target worthy of the name up there."[28] A PACAF report resorted to claiming amorphous benefits such as how the POL attacks "indicate to South Vietnam the U.S. intention to increase pressure against NVN aggression" and "enhance the RVN [Republic of Vietnam] political situation by underscoring the U.S. resolve to continue support of the RVN government."[29] The comments about impressing South Vietnam and underscoring resolve sound more like attempts to appropriate administration rhetoric than the usual military efforts to characterize effectiveness in material terms such as reducing infiltration.

Commanders also defended the POL effort by claiming political interference and indecision had hamstrung it. Marine Corps Commandant General Wallace Greene testified at the 1967 Stennis Committee hearings that "we have been unable to cut off the entering artery of POL at Haiphong, and until that is done, the air campaign, dispersed as it must

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[26] Letter from M. Bundy to the President, Spring 1967, Pentagon Papers, IV.C.7.(b), vol. II, p. 27.
[27] Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 97.
[28] Maj. Gen. Rockly Triantafellu, OHI transcript, May 3, 1971, K239.0512-485, in USAF Collection, AFHRA, p. 11.

be around the country against small storage points, is not going to be as successful as it should be."[30] Admiral Sharp thought in 1967 that one reason for the POL campaign's ineffectiveness was that "It came after a long period of discussion in public print, and I think the enemy took advantage of that period and dispersed his supplies."[31] Major General Ginsburgh also thought the campaign's late start had given the enemy time to disperse supplies, but still thought if all the requested large POL storage sites had been hit and "if we had carried on the POL campaign for just a couple weeks longer, I think we would have been able to show conclusively to the President: 'we do have evidence to prove that the POL campaign is significantly drawing down North Vietnam's stocks.'"[32]

Varying degrees of validity characterized the three officers' remarks. General Greene's criticism sounds plausible, but Admiral Sharp's seems questionable for at least two reasons. First, the U.S. had consistently attacked enemy POL in previous wars, so the Vietnamese could have anticipated such a move and begun preparing dispersal plans anyway. A December 1966 RAND Corporation study commissioned by the USAF stated the North had pursued "an urgent, comprehensive, and determined crash program to prepare the country for unrestricted air attack and possible ground invasion, and for a war of indefinite duration" ever since Rolling Thunder had begun.[33] Second, even if the POL system were destroyed prior to its dispersal, the North Vietnamese could have merely

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[29] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 58.
[30] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 447.
[31] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 35.
[32] Ginsburgh, OHI transcript, pp. 37-38.
[33] Oleg Hoeffding, Bombing North Vietnam: An Appraisal of Economic and Political Effects. RAND Corporation Memorandum RM-5213-1-ISA, Dec. 1966, p. v.

slowed their infiltration effort until they had built and switched over to a more dispersed system. Temporarily reduced enemy activity during the transition period might even have influenced the U.S. to scale back bombing, giving the enemy more of a respite. General Ginsburgh acknowledged that dispersal lowered air strikes' potential effectiveness, but his speculation about what might have happened could neither be proved nor disproved. The subsequent discussion will show that similarly unprovable claims were a common feature of Rolling Thunder effectiveness assessments.

An explanation more consistent with prevailing military reasoning might have been to reiterate Admiral Sharp's tenet that the POL effort would have been more effective if combined with attacks against "targets in all systems, instead of concentrating on just one system."[34] Sharp and others had advocated such broad attacks. General Momyer put a psychological spin on Sharp's argument when he said, "this piecemeal application of airpower [POL campaign] was relatively ineffective because it still avoided many of the targets that were of most value to the North Vietnamese. Consequently, the message conveyed by these strikes on the oil facilities lacked the necessary ring of authority. Though harsh, the tone seemed also hesitant and uncertain to the North Vietnamese."[35]

Judging Interdiction Effectiveness

The POL effort illustrated the close linkage military leaders perceived between fixed target and armed reconnaissance missions in that effectiveness of one mission type

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[34] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, pp. 24-25. See also pp. 32-33. and 93.

should influence effectiveness of the other. Fixed target and interdiction results were so closely intertwined that the two could not be cleanly separated without creating a false distinction. Such close relationships seemed plausible because North Vietnam, like other countries, was an integrated political, economic, and military system consisting of a number of subsystems. Interdiction, which the USAF officially defined as meaning "to prevent or hinder, by any means, enemy use of an area or route,"[36] was the leading second order criterion by which the U.S. judged Rolling Thunder's success, epitomizing a belief that bombing the North influenced the war in the South.

The USAF had developed basic aerial interdiction principles during previous wars and attempted to apply them in Vietnam. Seventh AF Commander General William Momyer was considered an articulate expert on the subject and later wrote <u>Air Power in Three Wars</u>, a book comparing interdiction and related operations in World War II, Korea, and Vietnam. Momyer told the Stennis Committee in 1967 that aerial interdiction consisted of three "elements." The first was the enemy's heartland where industry produced war materials. The second was the enemy's supply consumption rate, the key being to force him to use supplies faster than he could replace them. The usual way to accelerate supply use was to engage the enemy in sustained ground combat. The third element was to cut the supply flow between the enemy heartland and the battlefield. Achieving complete success against any one element was practically impossible, so

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[35] Gen. William W. Momyer, <u>Air Power in Three Wars</u>, (Washington, D.C.: Department of the Air Force, 1978), p. 23.

successful interdiction normally required addressing all three simultaneously. Persistent air

attacks throughout the enemy's heartland and all along the supply routes, in addition to air

and ground fighting on the battlefield would have a cumulative attritional effect on the

flow of war materiel.[37]

Air commanders understood that interdiction in Vietnam deviated from the

traditional pattern Momyer described. Attacks against industrial targets could curb

indigenous war materiel output, but North Vietnam imported most supplies from other

countries not subject to attack. Self-imposed targeting restraints further complicated

interdiction planning. The port of Haiphong through which most imports arrived

contained fixed targets the destruction of which would have supported air interdiction of

transportation routes, but the port facilities themselves were usually off limits. Railroads

linking the Hanoi area with China were at least partially subject to air attack, so bombing

those lines could reduce imports. The enemy's actual industrial heartland was therefore

almost invulnerable, so the North Vietnamese could easily obtain imports to repair damage

and replenish supplies after bombing raids. Momyer's second interdiction element was

also difficult to exploit because the elusive North Vietnamese ground forces could avoid

combat, circumventing American efforts to compel them to expend supplies. The only

interdiction element susceptible to heavy and sustained U.S. attack was the transportation

network between the Hanoi-Haiphong area where most imports arrived by ship or train

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[36] AFGOA/RAND Southeast Asia Study Group, "The U.S. Out-Country Interdiction Effort in Southeast Asia: Some Assessments of Results and Opportunities," Jul. 1, 1968, K143.5045-1, in USAF Collection, AFHRA, p. iii.

[37] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 143.

and the fighting area in South Vietnam. The most optimistic bombing advocates hoped

that if bombing could disrupt southbound transportation severely enough, the enemy might

import unlimited war materials yet be unable to move them to South Vietnam.

Constrained interdiction options did not necessarily discourage military

commanders who simultaneously exuded confidence in interdiction's overall effectiveness

while bemoaning restrictions they felt made the effort less effective than it could have

been. In 1967, Adm. Sharp thought the interdiction effort was beneficial because "our air

campaign puts a ceiling on the troops that they [North Vietnamese] can employ down

there [South Vietnam] and the level of effort."[38] About a week after Sharp's remark, Gen.

Momyer told the Stennis Committee that interdiction was working because "the [aircraft]

loss rate has gone down, the number of sorties has gone up, and the bombing accuracy has

gone up, and consequently we have been able to have more effect upon the interruption

and the interdiction of the lines of communication." Therefore, "Looking at your

interdiction in these terms [transportation disruption], we have been tremendously

effective."[39] Remarkably, an Air Force report published after the campaign had ended

claimed that months after the President had restricted bombing to the southern panhandle

and just before he ended it altogether was the time when, "the 7AF interdiction program

reached full fruition" because "all truck movement from NVN into Laos ceased," the

enemy had withdrawn between 16 and 18 ground troop regiments due to supply

shortages, and "The movement of supplies by any means eventually fell to an

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[38] Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 83.
[39] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, pp. 168-169 and 144.

unprecedented low in October [1968]."[40] Those retrospective comments suggested

interdiction had finally started working just as the administration lost hope.

In a parallel with their thoughts about sortie counts, commanders argued during

the campaign that although interdiction was succeeding, even better results would be

forthcoming if the available interdiction sorties could be better utilized. A PACAF report

noted "the most efficient way to interdict is to strike at the source ... the best method

available for increasing effectiveness was not intensifying the interdiction program but

striking highly lucrative source targets."[41] In other words, plenty of sorties were available,

but they needed to be assigned better targets. Unfortunately, the "source targets" were

fixed sites normally off limits to bombing, so fixed target restrictions carried over into

interdiction.

Haiphong harbor, perhaps the ultimate source target, was the North Vietnamese

supply system's linchpin, and air leaders doubted an air interdiction effort that excluded it

could be conducted efficiently or effectively. Recognizing the North's lack of industry

that obliged heavy reliance on imports, Gen. Meyers, using an analogy reminiscent of Gen.

Momyer's description of the first element of aerial interdiction, opined, "This port

[Haiphong] represents to North Vietnam what the industrial capacity of Germany and

Japan represented to them during the World War II time period."[42] If the port were

closed, the enemy would have to find alternative means of receiving 75 to 85 percent of

his imports and his ability to recover from bombing attacks and send supplies south would

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[40] CHECO Report, "Rolling Thunder, January 1967 – December 1968," pp. 37-39.
[41] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 96.

have decreased. When denied approval to bomb port facilities, air planners tried

"peripheral interdiction methods" to isolate Haiphong by cutting the roads, railroads, and

waterways connecting the seaport to the rest of the country. If successful, the effort

would have stranded imported supplies at the port, but curtailing supply distribution

proved difficult due to the surrounding transportation network's large excess capacity.

An Air Force report acknowledged that if either one of the two highway bridges to

Haiphong stayed open, "the entire capacity of the port could be distributed."[43] Any

remaining railroad or waterway links represented surplus transport capacity. If peripheral

interdiction close to Haiphong proved inadequate, there seemed even less hope aircrews

could find and destroy supplies scattered throughout the transportation network.

Senior officers repeatedly insisted striking Haiphong would dramatically improve

interdiction results. Admiral Sharp would have preferred to interdict supplies

concentrated at Haiphong rather than allowing them to be dispersed in the countryside

because, "once the supplies start spilling out of there, you have so many alternatives that it

is difficult to use air interdicting."[44] General Meyers lamented, "It just does not make

sense to me that we would put thousands of sorties into North Vietnam on armed

reconnaissance when the material we are trying to destroy is located in a very vulnerable

position as it is off-loaded from the ships in the port at Haiphong,"[45] yet Meyers was

optimistic about interdiction's potential provided Haiphong harbor were closed, noting,

Footnotes

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[42] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 475.
[43] CHECO Report, "Rolling Thunder, January 1967 – November 1968," pp. 9-11.
[44] Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 73.
[45] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 476.

[W]hen you close one area of supply support, the enemy is going to increase his use of alternatives. ... If you close the harbors, they will try to come over the railroad and the road nets ... When they do this, they are concentrating again more of their resources in one spot, and you have a more lucrative target. Our air efforts are going to be able to destroy more per sortie than we can do right now, and I think it would make it very, very difficult for them to continue to bring material in by these methods.[46]

General Momyer agreed about the need to interdict supplies as close to their source as possible, noting,

The campaign, to be effective, had to begin with attacks on the head of the system in North Vietnam. At that point the lines of communications were most vulnerable to an attack, and there the supplies and repair and support facilities for the entire logistics system were located. Sortie for sortie, there the most devastating attrition on supplies could be achieved, and there the most vulnerable bottlenecks were located. Interruptions in the flow at those points would create a greater delay and disruption of materiel moving through the rest of the network. ... In the southern part of the system, traffic dispersed and moved in such small segments that we could not achieve a satisfactory destruction rate per attack.[47]

Efficiency was central to all three officers' views. They agreed the key to effective interdiction was focusing attacks against the densest concentrations of lucrative targets - many of which were fixed sites rather than the customary armed reconnaissance targets - and the best way to force such a concentration was to deny the enemy use of alternative routes. More damage per sortie flown would improve effectiveness. Based on their previous wartime experiences, they did not consider North Vietnam immune to interdiction. Of course, their hopes of improving results were predicated on actions the administration did not sanction.

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[46] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 490.
[47] Momyer, Air Power in Three Wars, p. 174.

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Secretary of Defense McNamara disagreed with his military advisors' interdiction

concepts and outlook. Whereas air commanders concentrated on the second order issue

of how best to reduce enemy traffic, McNamara was, from the campaign's outset, deeply

concerned with interdiction's political dimensions. In his July 1965 Rolling Thunder

review, he asserted, "Interdiction should be carried out so as to maximize effectiveness

and to minimize the political repercussions from the methods used." He maintained that

there was no practical difference between interdicting supplies during importation, along

the way toward the South, or in South Vietnam, but,

> [D]ifferent amounts of effort and different political prices may be paid
> depending on how and where it is done. The critical variables in this
> regard are (1) the type of targets struck (e.g., port facilities involving
> civilian casualties vs. isolated bridges), (2) type of aircraft (e.g., B-52s vs.
> F-105s), (3) kind of weapons (e.g., napalm vs. ordinary bombs), (4)
> location of target (e.g., in Hanoi vs. Laotian border area), and (5) the
> accompanying declaratory policy (e.g., unlimited vs. a defined interdiction
> zone).[48]

McNamara's heightened political sensitivities were consistent with his position as

Secretary of Defense, but air commanders were incredulous at the idea that successfully

cutting enemy transportation by using politically inexpedient planes or bomb types could

be an unacceptable policy.

By 1967, McNamara was losing confidence in aerial interdiction's potential and

felt, "I don't think we are doing it [bombing] very well in terms of reducing the flow of

men and materiel into the south." He was by then highly skeptical about military plans to

close the port of Haiphong because he believed the enemy's "present heavy reliance on

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Haiphong represents convenience rather than necessity" and that the Vietnamese would be able to import sufficient supplies at many other points along the coast and across the Chinese border. Therefore, closing the port "would not be an effective means of stopping the infiltration of supplies into South Vietnam."[49] McNamara envisioned enemy counters to every imaginable U.S. action from closing the ports to cutting railroads and concluded there was no way to prevent enemy importation and movement of war materials. In view of the 1966 POL campaign's disappointing results despite the military commanders' expectations of success, McNamara may have deemed his own doubts well founded. Conversely, his skepticism may have set the stage for a self-fulfilling prophecy by ruling out options that might have made interdiction work better.

One reason why Secretary McNamara doubted interdiction's potential efficacy was the apparently dramatic imbalance between the low supply requirements of enemy forces in the South and the high capacity of their transportation system, a situation reminiscent of the imbalance between the North's fairly modest POL requirements and large import and storage capacities. The Secretary cited reports claiming all enemy forces in South Vietnam in 1967 required a total of only 15 tons of supplies from the North each day, but their road and trail network was able to handle about 200 tons per day.[50] He acknowledged the 15 ton figure seemed too low, but asserted that even if the true number were several times larger, the implication was the same, namely, "the capacity of the lines

[48] McNamara's Rolling Thunder review, July 30, 1965, Pentagon Papers, IV.C.3, p. 140.
[49] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, pp. 370 and 281.
[50] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 277 and 281. The 15 tons excluded food, nearly all of which enemy troops obtained locally in the South.

of communication and of the outside sources of supply so far exceeds the minimal flow

necessary to support the present level of North Vietnamese military effort in South

Vietnam the enemy operations in the south cannot ... be stopped by air bombardment -

short, that is, of the virtual annihilation of North Vietnam and its people."[51]

McNamara's growing doubts paralleled intelligence reports such as a 1966 CIA

study of North Vietnam's road network which found the system's crude nature and ease

of repair meant the "goals of sustained interdictions of the rudimentary road and trail

networks in southern North Vietnam and Laos will be extremely difficult and probably

impossible to obtain in 1966."[52] Secretary McNamara ultimately doubted interdiction

would work under any plausible circumstances, noting, "all of the evidence is so far that

we have not been able to destroy a sufficient quantity to limit the activity in the south

below the present level, and I do not know that we can in the future."[53] About five

months after he uttered those words, the 1968 Tet Offensive seemed to validate his

pessimism. The interdiction effort had not stopped the enemy from amassing enough

supplies for a major attack.

Regardless of McNamara's thoughts, air commanders developed diverse ways of

demonstrating that aerial interdiction was working in Vietnam. They realized interdiction

results derived from direct observations such as pilot reports and strike photos were

incomplete, so they tapped into other, less direct sources. A 1966 PACOM report

asserted, "The overall effect of our LOC interdiction program can best be evaluated by

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[51] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 280.
[52] CIA report, Mar. 1966, Pentagon Papers, IV.C.7, vol. I, p. 82.

reports of prisoners, defectors, and observers, plus the reduced scale of VC-initiated engagements over the past several months." The report said those sources acknowledged enemy recovery efforts could largely offset road and bridge damage, but destruction of vehicles was "moderately effective in reducing the flow of goods southward to the VC."[54] Even if air commanders could not attack the Haiphong docks or Hanoi supply stockpiles, they could still observe those sites for signs of interdiction's results. Cargo stacked in the streets, delays in unloading ships at Haiphong, or unusually large supply accumulations in Hanoi might "attest to the mounting logistic problems faced by the enemy" because those signs suggested the enemy was unable to distribute vital war materials due to effective air interdiction.[55] All these clues fed into the ongoing LOC activity analyses Seventh AF and PACAF performed while trying to understand the North Vietnamese transportation system and find the optimum ways to disrupt that system.

Interdiction data came in many forms, but not all types carried equal weight. Some USAF interdiction effectiveness indicators were simple numerical measurements of transportation disruption that might have been used in World War I. Typical examples included numbers of trucks, boats, and rail cars sighted, attacked, damaged, and destroyed along with estimates of the resulting transportation disruption, yet analysts emphasized some statistics more than others. Roads were easy to fix and trucks were difficult to locate. Even when aircrews saw and attacked trucks, damage was uncertain. General Momyer recalled that truck statistics "were and are subject to differences of interpretation.

[53] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 309.
[54] Headquarters PACOM, Operations Division, Rolling Thunder Digest, Oct. – Dec. 1966, p. 27.

The difficulty in confirming a truck destroyed plagued the commanders of Seventh AF throughout the war. The North Vietnamese were able to move trucks struck during the night into the heavy jungle. Reconnaissance was not able, therefore, to provide the desired evidence on many missions as to the number of trucks destroyed/damaged." Nevertheless, Momyer estimated aircraft killed between 15% and 18% of the trucks they sighted.[56] Aircraft could sink boats and mine waterways, but they could neither obstruct nor destroy waterways, so the degree of water-borne transport disruption remained uncertain. Watercrafts were small and usually concealed in heavy brush.

Bombing's railroad results seemed more amenable to analysis partly because trains were confined to their tracks and damage was more easily verified. Counting railroad cars destroyed or damaged was a popular metric for aircrews and staff planners alike, and a PACOM report remarked, "the destruction of the rolling stock is of primary importance."[57] Railroad cuts were plainly visible from the air and the time required to repair them clearly indicated the duration of the disruption achieved. A PACAF report considered notable the fact that the northeast rail line from Hanoi to China was closed for 25 days and the line from Hanoi to Thai Nguyen was cut for 20 days in 1967. Railroad cuts forced the enemy to unload trains and transship cargoes around the cuts so counting (or estimating) the number of tons transshipped per month was another railroad interdiction effectiveness indicator. Pacific Air Forces deemed the rise from 152,000 tons transshipped in May 1967 to 259,000 tons in August gratifying, but found even more

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[55] Rolling Thunder Digest, Apr. – Jun. 1967, p. 28.
[56] Momyer, Air Power in Three Wars. p. 213.

encouraging the fact that the tonnage remained about the same in September despite a

decreased sortie rate.[58] More measurable disruption with fewer sorties implied higher

efficiency, an important contributor to effectiveness. Pacific Command deemed railroad

status so important that each Rolling Thunder Digest edition beginning in January – March

1968 included a table showing how many days per month each important line was closed,

operated on a shuttle basis between cuts, or fully open.

Despite favorable railroad interdiction statistics, the USAF realized significant

supply tonnages were still moving south and denied interdiction could ever stop all

movement. Air Force officials readily admitted "Armed reconnaissance could not stop the

flow [of supplies],"[59] but still found ways to accentuate positive results. Pacific Air Forces

reports admitted only about 30% of imported supplies were destroyed in transit, yet noted,

"Although supplies and reinforcements continued to flow despite U.S. attacks on LOCs,

the Allies had made it very costly to the enemy in terms of materiel and manpower."[60]

The report's terminology resembled a comment Secretary McNamara once made about

putting, "a high price tag on North Vietnam's continued aggression"[61] and made it seem

the interdiction statistics represented the size of the price tag rather than indications of

reducing supply movements enough to defeat the North Vietnamese.

Estimating costs imposed on the enemy was not easy, but commanders thought

"extreme" North Vietnamese methods of counteracting interdiction meant bombing was

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[57] Rolling Thunder Digest, Oct. – Dec. 1967, p. 16.
[58] CHECO Report, "Rolling Thunder, January 1967 - November 1968," pp. 6-8.
[59] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 28.
[60] CHECO Report, "Rolling Thunder, January 1967 - November 1968," p. 13.

succeeding even if supplies still got through. Evaluating a 1966 interdiction effort,

PACOM concluded, "The heavy weight of the strike effort in ... Route Package 1 over

the past months is commencing to show results in terms of the measures the enemy has

been forced to adopt to maintain a flow of men and materiel. ... An example of the highly

successful interdiction campaign which has forced the enemy to extreme measures in the

routing of supplies can be shown by the damage inflicted to choke points."[62] The

assessment's wording shaped its connotation. Resorting to "extreme measures" implied

heavy material, financial, and psychological costs. The phrase suggested a compulsory

diversion of resources to repair work and that enemy morale suffered accordingly.

Substituting a term like "bold, innovative measures" would have given a very different

connotation to the enemy's observed perseverance.

Brigadier General Jammie Philpott of Seventh AF intel used a more quantitative

metric to express interdiction's material costs. He tracked each month's secondary

explosions and truck kills. Using standard planning factors for how much material each

explosion or truck kill represented, he calculated total supply tonnages destroyed. He

assumed 40% of the supplies were ammunition, and by "Arbitrarily assigning percentages

of ammunition by type," deduced how many artillery shells, AAA rounds, mortar rounds,

and rockets had been destroyed. A firm believer that bombing the North helped the war in

the South, Philpott concluded, "The magnitude of destruction is of greater significance

when one considers that all of this ammunition enroute to the DMZ area was destroyed

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[61] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 278.
[62] Rolling Thunder Digest, Oct. – Dec. 1966, p. 13.

prior to the heavy artillery, mortar, and rocket attacks" on U.S. positions in South

Vietnam.[63] Interdiction success meant fewer rounds fired at U.S. troops.

Commanders realized that aircrews applied different criteria than they did when

judging the effectiveness of armed recce missions. Senator Stennis asked Admiral Sharp

about complaints from Air Force pilots on armed reconnaissance flights that "many of

these missions were almost an act of futility" because the pilots saw nothing worth

attacking and ended up bombing some insignificant backup target. Sharp replied that

armed reconnaissance missions had what might be called the negative purpose of denying

the North Vietnamese the use of roads, railroads, and waterways for the duration of the

flights, which lasted about an hour and a half. If the pilot was flying over a road,

> He has in effect denied it to the enemy for an hour and a half. He may at
> that point dump his bombs on something that is not a very good target, and
> that is what causes these people to come back and say it is an exercise in
> futility. At such time that all our planes are over the area 100 percent of
> the time, and they never see a truck and they never see a train and they
> never see a boat because there are none out, then we are 100 percent cost
> effective. We have accomplished our mission. There is no more
> infiltration.[64]

Reports from Sharp's PACOM headquarters applied similar negative interdiction

criteria. One 1966 report discussed attacks against a road passing through a steep valley.

The road itself was the target. The report did not mention any trucks destroyed, but

noted, "Reduced vehicle sightings in the area is an indication of the effectiveness of a

concentrated day and night strike effort to reduce infiltration of men and materiel through

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[63] Brig. Gen. Jammie M. Philpott, End-of-Tour Report, Dec. 6, 1967, K740.131, in USAF Collection, AFHRA, pp. 9-11.

[64] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 72.

the Mu Gia Pass and destroy the vehicles supporting them."[65] A 1968 PACOM report

noted, "Trucks destroyed or damaged in NVN decreased from 1286 in July to 1042 in

August. The number of trucks sighted during August was about 25 percent less than July.

This reduction is attributed in large part to the sustained interdiction effort."[66] In other

words, fewer trucks seen meant effective interdiction. Unlike aircrews, senior

commanders and staff members often judged interdiction by the second order effect of

restricting enemy transportation. First order physical destruction could be a secondary

concern as long as fewer vehicles were moving.

Preventing transportation during good flying weather was not sufficient to choke

off movement because the North Vietnamese could also travel during inclement weather

when no aircraft were flying. As early as 1965, the USAF estimated 80% of road traffic

moved by night so, the U.S. scheduled night armed reconnaissance missions (some of

which were known by the term Night Owl) equipped with flares to find and attack truck

convoys, but night operations were certainly more difficult than daytime flights.[67] Admiral

Sharp did not say whether denying the ability to travel during good flying weather was a

significant impediment to infiltration, but in a May 1965 message, Ambassador Taylor

said, "Although their general transportation system in [the] North has been significantly

damaged, thus somewhat reducing their infiltration capability, Hanoi may calculate it can

accept [the] level of damage being inflicted as [a] reasonable price to pay for [the] chance

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[65] Rolling Thunder Digest, Oct. – Dec. 1966, p. 18.
[66] Rolling Thunder Digest, Jul. – Sep. 1968, p. 22.
[67] CHECO Report, "Rolling Thunder, July 1965 - Dec 1966," p. 20.

of victory in [the] South."[68] Furthermore, if McNamara's figures about incredibly small enemy supply needs were even close to accurate, travel during inclement flying weather may have been enough to meet most enemy logistic demands.

Darkness and bad weather hindered air interdiction, but the overall effort was quite extensive. Armed recce was authorized everywhere except in areas the administration expressly declared off limits. Unfortunately, as with fixed targets, air leaders were perennially convinced the off limits areas contained the most important targets, so they argued the restrictions reduced interdiction's potential effectiveness and endangered aircrews. They also thought the proximity of "sanctuaries" to approved armed recce zones exerted a disproportionately deleterious influence on interdiction.

Railroad interdiction dramatized the adverse consequences of prohibited zones or sanctuaries around Hanoi, Haiphong, and the Chinese border. An October 18, 1967 aerial survey of North Vietnam's railroads showed 80% of the rolling stock was sheltered in the sanctuary areas.[69] Although PACAF reports extolled the durations of track cuts and tons of cargo transshipped around those cuts, the prohibited zones channeled U.S. armed reconnaissance flights into short track segments. The rail line running 82 miles northeast from Hanoi to the Chinese border could not be attacked within 25 miles of China or within 30 miles of the center of Hanoi, leaving only an approximately 27 mile long segment pilots dubbed Slaughter Alley open to attack.[70] The enemy soon noticed where attacks occurred and massed air defenses along that part of the line. Flying through concentrated

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[68] Message from Ambassador Taylor, May 4, 1965, Pentagon Papers, IV.C.3, p. 107.
[69] Rolling Thunder Digest, Oct. – Dec. 1967, p. 16.

antiaircraft fire along that segment presumably led to worse aircraft losses than if attacks

(and air defenses) had been spread over the entire railroad network.[71] The enemy was also

able to concentrate work teams and construction materials along a portion of the line,

facilitating easier repair than if damage were liable to occur anywhere along the tracks.

A sense of hopelessness occasionally intruded upon the commanders' otherwise

optimistic interdiction expectations. Air Staff planner Col. Edelen said the severe

antiaircraft environment along the northeast rail line combined with the prohibitions

against bombing Haiphong harbor made CINCPAC see little reason to expend resources

trying to interdict that line, "as long as we are leaving the gate open in Haiphong where

95% of the materials are coming through."[72] The most militarily logical plan would have

been to close the harbor first then cut the rail line. The long flying distance between air

bases and the rail lines in northeastern North Vietnam would have degraded armed recce

effectiveness in that area even without allowing for air defenses and the fact that cutting

the lines would have made little difference as long as Haiphong remained open.

Air planners thus faced a frustrating dilemma as long as Haiphong remained a

sanctuary. Easily computed statistics could have portrayed railroad interdiction as

imposing a heavy price on enemy aggression, but such results would have been costly to

achieve and would not have significantly harmed enemy war fighting potential even if

performed successfully. Not pressing railroad attacks vigorously would have reduced

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[70] Sources disagree widely about the segment's length, but agree the segment was short.
[71] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, pp. 449-450. See also p. 482. The Senate transcript deletes the prohibited zones' sizes so the numbers are from the CHECO Report, "Rolling Thunder, July 1965 - December 1966," pp. 15 and 46.

aircraft losses, but made the interdiction effort appear even less successful in terms of cut

duration and cargo transshipment. An apparent inability to cut rail lines by may have

compounded doubts about the feasibility of closing Haiphong even if political approval to

bomb the port were forthcoming. Whether the USAF emphasized straightforward railroad

disruption statistics or broader, yet less quantifiable factors such as estimated aircraft loss

rates or the railroads' limited practical relevance as long as the seaport stayed open, the

whole interdiction outlook seemed bleak as long as unlimited imports through Haiphong

continued. However, air commanders were still not entirely discouraged.

When cornered, commanders resorted to interdiction effectiveness indicators based

more on speculation, faith, and intuition than on observable, quantifiable results. By using

hypothetical assumptions, they sometimes claimed interdiction was effective because it

foiled enemy intentions. Proving bombing had achieved a positive object such as cutting a

rail line was much simpler than showing it had prevented a negative outcome such as a

stronger enemy attack, yet nebulous negative claims had their own advantages.

Many military officials made relatively generic and modest claims about

interdiction's preventive powers. A 1965 Air Force report said, "PACAF believed there

was a decrease in the flow of supplies to enemy units in Laos and the RVN, reducing the

enemy capability of massing units to launch large scale offensives."[73] The comment was

very similar to statements later made in CIA/DIA reports that bombing had "degraded

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[72] Edelen, OHI transcript, p. 87.
[73] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 9.

North Vietnam's capability for sustained large-scale conventional military operations,"[74]

and suggested a modicum of Air Force skill in using "inexact and impressionistic

language." General Momyer wrote, "the effectiveness of the air attacks against the

enemy's logistical system largely determined the quality and size of enemy forces facing

him [Gen. Westmoreland] as well as the length of time the enemy could sustain an

offensive."[75] Seventh AF intel chief Brig. Gen. Philpott claimed bombing had "served to

substantially reduce North Vietnamese offensive capability and resulted in a notable

decrease to enemy initiated attacks in South Vietnam."[76] Air Staff planner Col. Edelen

asserted interdiction had made enemy forces limit the durations of their campaigns because

units consumed supplies faster than they received them.[77]

Other speculative claims were more explicit and far-reaching. Chief of Staff Gen.

McConnell said in 1967 that the North Vietnamese had tried to conquer the South in 1965

by inserting a larger ground force into South Vietnam. Had they succeeded, McConnell

estimated the U.S. would have needed "perhaps more than 800,000 U.S. troops at a cost

of $75 billion over what we have already spent," but "the effective employment of

airpower" had interdicted enemy forces and kept infiltration "far below the level which the

enemy could otherwise have achieved."[78] Two years later, McConnell still said air

interdiction had "certainly cut down the capability of the North Vietnamese and the Viet

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[74] CIA/DIA, An Appraisal of the Bombing of North Vietnam. Sep. 15, 1967, p. 10. (Cited hereafter as "CIA/DIA Appraisal.")
[75] Momyer, Air Power in Three Wars, p. 199.
[76] Philpott, End-of-Tour Report, p. 5.
[77] Edelen, OHI transcript, pp. 120-121.
[78] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 202.

Cong to carry on sustained operations."[79] Chief of Naval Operations Adm. Thomas

Moorer also argued, "Had we not conducted the bombing, there is no question about the

fact that the effort they are putting forth in South Vietnam would be much larger."[80]

Implicit in both the service chiefs' claims was the idea that if the administration's half-

hearted interdiction campaign had already prevented large enemy attacks, then escalated

bombing might checkmate even larger hostile initiatives. The chiefs also assumed the

North Vietnamese intended to launch those larger attacks.

The sweeping nature of some of those claims placed them in a different category

than Adm. Sharp's assertion that armed reconnaissance missions that saw no traffic were

still effective. Sharp's armed recce analysis relied on observable facts about the presence

or absence of enemy movement. The generic claims that interdiction reduced supply

shipments and thus lowered enemy offensive potential also seem reasonable. However,

the assertions made by McConnell and Moorer were unprovable, but impressive sounding

extrapolations of supposed underlying intentions behind observed enemy actions. The

very impossibility of proving the claims may have been an advantage because critics could

not disprove them either.

Proper timing is an important part of military operations, and air commanders

portrayed interdiction as a means of upsetting the scheduling of enemy operations.

Claiming that interdiction delayed enemy actions was a subset of the idea that it foiled

enemy plans, and was similarly hard to prove or disprove. If adequate supplies kept

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[79] Gen. John P. McConnell, OHI transcript, Aug. 28, 1969, K239.0512-1190, in USAF Collection, AFHRA, p. 22.

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moving south, air commanders still said interdiction had at least slowed that movement. A

PACOM report claimed, "There can be no doubt that the effects of the air campaign have

... disrupted delivery of men and supplies, and substantially increased the enroute time of

all logistic support to SVN."[81] The unequivocal nature of the phrase "there can be no

doubt" is bold, but the data upon which PACOM based it is not specified. Writing after

the war, Gen. Momyer said one reason interdiction was effective before the 1968 Tet

Offensive was "Troops trying to get to the front took three months as compared to the

earlier periods when it took only three or four weeks."[82] Since the transportation network

itself was the only one of Momyer's three interdiction elements open to attack, forcing

men and materiel to stay on the roads longer presumably offered air power more time to

find and destroy them. Disease, desertion, and other travel mishaps might also have had

more opportunity to winnow out enemy resources. Destroying a higher percentage of

what the enemy sent southwards would mean increased interdiction effectiveness;

however, measuring any delays imposed could only be a speculative endeavor at best.

Furthermore, conceding the enemy was adequately supplying his forces while

simultaneously arguing interdiction was succeeding because it delayed those supplies

seemed inconsistent. How could analysts know the enemy's intended enroute time for

supply shipments? The argument was based on unprovable premises.

In 1970, Gen. Meyers criticized the notion that delaying troop and supply

movements was a sign of effective interdiction under Vietnam War conditions. He

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[80] Senate Preparedness Subcommittee, Part 3, Aug. 23, 1967, p. 270.
[81] Rolling Thunder Digest, Oct. – Dec. 1966, p. 8.

thought, "once you fill up the pipeline, it really doesn't make any difference whether it takes that bullet thirty days to get from Hanoi to the battlefield or whether it takes 120 days. As long as the pipeline is full, he is still getting the same number of bullets out of the end of the line that were being put in up there less the attrition that takes place in between."[83] Delaying enemy movements may be important when trying to achieve a quick victory, but the U.S. was not trying to deliver a knockout blow. The North Vietnamese controlled the pace of ground combat.

Some assertions about what interdiction had prevented were even more speculative and less tangible. A 1967 Headquarters, USAF report noted, "The disruption of logistics support and enemy materiel destroyed has been of such magnitude as to represent the probable factor which to date has denied the enemy the capability to seize the initiative in SVN."[84] Secretary of the Air Force Harold Brown had previously stated, "the [1966] interdiction campaign has denied the North Vietnamese and Viet Cong the equipment and supplies with which they might have retained the initiative."[85] Customarily, seizing the initiative is a prerequisite to winning, but saying interdiction was succeeding because it had kept the North from seizing the initiative was another unprovable assertion. The Headquarters, USAF report mentioned above went on to say interdiction had made infiltration more costly, but conceded "its impact upon the will of the country to persist in

[82] Momyer, Air Power in Three Wars, p. 311.
[83] Gen. Gilbert Meyers, OHI transcript, May 27, 1970, K239.0512-282, in USAF Collection, AFHRA, pp. 119-120.
[84] Headquarters, USAF, "Air Operations - North Vietnam," Apr. 27, 1967, K143.5072-90, in USAF Collection, AFHRA, Part I, Tab A, p. 6.
[85] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 126.

its aggression is more difficult to identify."[86] Some participants felt interdiction was even

more decisive, but in the negative sense of preventing enemy victory. According to a

PACAF report, CINCPAC claimed bombing had disrupted the enemy enough "to

represent the probable balance of power which to date had denied the enemy a capability

for seizing significant portions" of South Vietnam's northern provinces.[87] The PACAF

report's claim may have sounded imposing in isolation, but it was a tepid finding for an

offensive campaign intended to "take the war to the enemy."[88]

Compared to his military commanders, Secretary McNamara was more skeptical

of aerial interdiction's ability to prevent events, and he carefully qualified any claims he did

make. In mid-1965, he reported interdiction "may have influenced a Communist decision

to forego a 1965 offensive in Laos" and "may have caused the VC summer offensive to be

less intense, aggressive and unrelenting than it would otherwise have been."[89] On the

whole, however, McNamara appeared more reluctant than the air commanders to credit

bombing with an ability to prevent or mitigate enemy actions.

Prevented events were impossible to measure, but claiming to have upset enemy

intentions implied effectiveness. The claims also assumed interdiction exerted a degree of

control over enemy actions that the U.S. probably did not possess. Other considerations

besides bombing may have determined how much the North Vietnamese were sending

south. McNamara thought it likely that "the flow of men and materiel into the south is not

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[86] Headquarters, USAF, "Air Operations - North Vietnam," Part I, Tab A, p. 6.
[87] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 87.
[88] Rolling Thunder Digest, all volumes, p. 2
[89] McNamara's Rolling Thunder review, July 30, 1965, Pentagon Papers, IV.C.3, p. 137.

determined by the air campaign in the north, but by the ability of the Vietcong and the

North Vietnamese ... to accept the men and materiel from the north. In other words, the

bottleneck is not on the lines of communication."[90] Since Rolling Thunder was largely an

interdiction effort and interdiction was intended to create transportation bottlenecks,

McNamara's remarks were tantamount to concluding interdiction was failing. That line of

reasoning also supported his view that the war would be won on the ground in the South

since successful ground combat would reduce the enemy's ability to accept more men and

materiel. In a rare point of agreement with McNamara, Army Chief of Staff Gen. Harold

Johnson said he was loath to speculate how bombing affected enemy plans because "we

are attributing to ourselves the knowledge that we simply don't have."[91]

The JCS formulated another hypothetical argument to explain why interdiction was

supporting U.S. war aims effectively. Most claims that interdiction worked in the negative

sense of preventing undesired enemy actions seemed to be alternative justifications to

supplement the physical destruction and other positive results bombing could hopefully

achieve in its own right. Recurring rumors about bombing pauses, cutbacks, or even an

outright halt may have encouraged commanders to recast those negative arguments into a

stronger form that emphasized the dire consequences that could no longer be prevented if

interdiction were stopped. The JCS contended in a late 1966 memo that even a modest

interdiction effort was better than the alternative of not bombing at all because,

> The measure of the effectiveness of the interdiction effort is the infiltration
> and its consequence which would be taking place if the air campaign were

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[90] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 316.
[91] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 433.

not being conducted. The cost to the enemy is not solely to be measured in terms of loss of trucks but in terms of lost capability to pursue his military objectives in SVN. Similarly, the cost to the US must consider that damage which the enemy would be capable of inflicting by infiltrating men and supplies now inhibited by the interdiction effort; this includes increased casualties in RVN for which a dollar cost is not applicable.[92]

General McConnell made very similar remarks in 1967 when he stated, "We can best judge the effectiveness of the air war in the north by measuring the costs of this effort against the probable cost to our forces in South Vietnam if we had not initiated and maintained the bombing campaign. Such a measurement becomes especially meaningful when we make it in terms of the extra lives lost and the additional men, supplies, and money that could have been required without airstrikes."[93]

McConnell did not elaborate on how to measure hypothetical effects such as lives and money saved, but assumed practically any interdiction campaign would save American lives and other resources. He was gauging results in comparison to the null hypothesis of not bombing rather than in terms of what the bombing had achieved. Comparing bombing to not bombing was different than debating the relative virtues of competing targeting strategies as the military and administration were doing when McConnell made his remarks in 1967, but a drastic geographic curtailment or total bombing halt - as distinguished from a temporary pause - was then emerging as a possibility. Military officials may have devised the null hypothesis argument in response to political pressures within the U.S. government. They might not have resorted to such a justification if they had not felt the strong need to defend the interdiction effort against administration

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[92] JCS memo to McNamara, Nov. 4, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 173.

skeptics. Political dynamics far from the battlefield might therefore have influenced the criteria commanders used when judging the campaign's military results.

Chapter 5 explained how military leaders disliked bombing pauses, but comparing bombing to not bombing reflected a rather paradoxical conviction that pauses simultaneously undermined and demonstrated interdiction effectiveness. Officials thought the enemy's military response to pauses was particularly revealing. When the U.S. temporarily suspended bombing, such as a four-day period in observance of the 1967 Tet holiday, enemy forces were quick to exploit the chance to improve their supply situation. The JCS expressed "grave concern" before the 1967 Tet pause began, saying, "To grant the enemy a respite during a four-day standdown at TET will slow our campaign, allow him time to reconstitute and replenish his forces, and cost us greater casualties in the long run."[94] General McConnell's later said the North used that pause to transport "a volume of supplies that would have required at least 38 days to move during periods of our air activity. The amount of effort, planning, and coordination necessary to mass the transportation and equipment for this one-time move was prodigious. It provides some indication of the effort North Vietnam is willing to expend to avoid exposing its transportation resources and combat supplies to air interdiction."[95] A PACOM report about the 1967 Tet pause included practically the same comments, but optimistically added, "This activity also implied an urgency of requirements which would support the conclusion that the effects of the air campaign are creating shortages in essential materials

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[93] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 201.
[94] JCS memo, Jan. 4, 1967, Pentagon Papers, IV.C.7.(b), vol. II, p. 4.

in the south."[96] Brigadier General Philpott of Seventh AF intel used a slightly different

metric to express the hectic enemy activity during the 1967 Tet truce when he noted, "The

level of daily supply movement during TET was 30 times greater than the daily average of

the six months preceding it."[97] Almost a year later, during the 36-hour New Year's

bombing pause of 1968, reconnaissance detected 1,795 southbound trucks moving

through North Vietnam compared to 513 during the 36 hours just before the truce.[98]

Statistics compiled year after year suggested that the enemy's herculean efforts to profit

from pauses indirectly revealed interdiction's effectiveness. The obvious inference was

that but for the pauses, the enemy would not have been able to move so many supplies.

Therefore, pauses were valid negative indicators of interdiction's effectiveness.

Practically all measures of interdiction effectiveness – even the most imaginative –

relied on masses of quantitative data ranging from truck counts to VC supply needs in

tons per day. Numbers can create an illusion of definiteness, but some air planners saw a

basic contrast between the data upon which fixed target results were judged and the often

more tenuous data adduced to assess interdiction. Air Staff planner Col. Henry Edelen

thought intel analysts really could use photos and pilot reports to measure success against

fixed targets, but he insisted DIA, CIA, and other intel agencies could only speculate

about basic interdiction parameters such as "throughput" which was the amount of

material the enemy was transporting. Edelen said, "Sure, the effectiveness of our bombing

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[95] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 203.
[96] Rolling Thunder Digest, Jan. – Mar. 1967, p. 8.
[97] Philpott, End-of-Tour Report, p. 6.
[98] CHECO Report, "Rolling Thunder, January 1967 - November 1968," p. 18.

is an important element of intelligence, but it's one that you can't get an answer on."

Supply throughput figures were "the principal ingredient required to determine the

efficiency of the air campaign," but the numbers were "nothing really definitive, there were

no hard facts on which this was based. These estimates are just pretty fair judgments

drawn from samplings over a long period of time." Remarkably, Edelen doubted even the

North Vietnamese were able to quantify how aerial interdiction had affected their

infiltration.[99] He did not mention any specific programs such as PACAF's ongoing LOC

activity analyses, but thought interdiction assessment was more art than science and

therefore subject to widely divergent effectiveness estimates.

Major General Ginsburgh also critiqued interdiction measurement techniques and

questioned the validity of the data intel analysts derived from them. Inability to divine

enemy intentions was pivotal to his doubts. He said,

> whether or not we actually limited the flow is virtually impossible to know
> because we don't really know how much the North Vietnamese would
> have liked to send South ... I believe that our intelligence evaluations went
> wrong in that they used a technique of estimating road capacities,
> uninterdicted. Road capacities, uninterdicted, in my view, are different by
> an order of magnitude than road capacities under interdiction. So, in my
> own view, we did limit the flow of men, but especially supplies to the
> South. But I know of no way of calculating to what extent we lowered the
> lid from what the North Vietnamese would have liked to send down.[100]

Edelen and Ginsburgh were skeptical Pentagon staff officers, but most USAF

commanders appeared determined to find some way to prove interdiction was working.

However, General Meyers was an exception who expressed second thoughts about

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[99] Edelen, OHI transcript, pp. 66-71.
[100] Ginsburgh, OHI transcript, pp. 61 and 63.

interdiction effectiveness during a 1970 interview. Although he had previously urged

attacks against Haiphong in order to curtail imports, he retrospectively outlined basic

theoretical reasons why interdiction could not have succeeded during Rolling Thunder.

The limited potential duration of even a successful interdiction campaign was the

underlying problem Meyers saw. He viewed aerial interdiction as a World War II

invention where "it was done on a definite time limitation only. You don't really try to

interdict a country for an indefinite period of time because it can't be done. ...

[Interdiction] is predicated on over-running the territory, taking it [with ground forces]

after some determinate period of time." Slowing German troop movements into

Normandy until the D-Day invasion force had established a beachhead was feasible, but

aerial interdiction could not have held the Germans at bay indefinitely. By the same token,

"the concept of interdiction as it was applied in Vietnam was really not a valid military

concept to start with because there was no limit – we never intended to take the territory.

... It should never have been called an interdiction program because an interdiction is

something of a definite time limit duration."[101] Meyers knew the U.S. had no plans to

conduct a D-Day style assault against North Vietnam, yet he had tirelessly advocated air

attacks designed to improve interdiction results. He may have considered Rolling

Thunder's interdiction function ultimately futile because the operation was designed to

insulate South Vietnam for an indefinite but long period, but he had still tried to make the

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[101] Meyers, OHI transcript, pp. 118-120.

program work. Whether he reached his pessimistic conclusion during the campaign or

after it had ended is unclear.

Measurements designed to assess interdiction ranged from mundane statistics to

imaginative speculations, but viewing the enemy as a system of interrelated transportation-

related components to be influenced in ways conducive to American objectives was a

common thread running through them. Most metrics were logical attempts to chart

progress, but some may have been products of frustration or political wrangling. If the

campaign had shown obvious signs of crippling North Vietnamese military operations in

the South, commanders might not have become so creative in devising ways to claim some

modicum of success. An atmosphere where commanders believed that interdiction would

succeed if only the onerous political impediments could be removed and the proper targets

struck may have bred effectiveness measurement concepts that would not have been

developed under less inhibited operational circumstances.

Economic Results and Systems Analysis

The North Vietnamese transportation system subjected to aerial interdiction was,

in turn, closely integrated into the nation's economic system. Strategic bombing of

economic infrastructure has long been a staple of air power theory, and measuring results

in economic terms may have seemed uniquely persuasive to leaders of the world's largest

economy. American military leaders experienced at fighting industrialized enemies like

World War II Germany and Japan believed analogous methods would work against North

Vietnam, with some adjustments. They claimed that undermining the North's economy

would supplement interdiction and produce wide-ranging systemic consequences.

However, the enemy proved more tolerant of economic damage than expected, and U.S.

leaders had trouble comprehending the North's apparently crude economy well enough to

apply systems-oriented assessment criteria.

Military officials often touted bombing's potential to derail North Vietnam's

domestic economy and international trade. The attending disruption would presumably

spill over into other important systems. One PACOM report claimed, "A major effect of

the RT campaign against North Vietnam has been to force Hanoi to cope with disruption

to normal economic activity, particularly in modern industry, [electrical] power,

transportation, and distribution."[102] A PACAF report said eliminating 85% of the North's

electrical generation capacity by 1967 had "produced a considerable economic loss."[103]

Officials thought that if Hanoi faced the choice between feeding its people and waging war

in the South, the regime would scale back the war. By mid-1967, Haiphong docks

congested with imports that were difficult to distribute over interdicted transportation

networks led Gen. McConnell to conclude, "the North Vietnamese leaders are facing

increasing problems in maintaining the nation's economy at a level that is adequate to feed

and supply both the civilian population and armed forces."[104] He added that industrial

damage had forced the North to import materials the country had previously exported,

resulting in an increasingly unfavorable trade balance. Analysts projected continuing

adverse economic consequences. A 1967 PACOM report predicted, "Destruction of these

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[102] Rolling Thunder Digest, Oct. – Dec. 1967, p. 9.
[103] CHECO Report, "Rolling Thunder, January 1967 - November 1968," p. 14.

and other industrial targets will force NVN to rely upon less efficient methods and facilities. Loss of the ... steel facilities and the cement plant will leave NVN only one major export – coal. Hanoi will be forced to depend almost exclusively upon grants-in-aid to finance the conflict in SVN and imports for domestic consumption."[105] Major General Ginsburgh was atypical in that he deemed economic consequences a secondary issue and in a 1971 interview he recalled, "disruption of the economy had not been a major objective of the campaign, but more a by-product."[106]

Civilian officials tended to segregate Rolling Thunder's military and economic aspects and to doubt its economic disruption potential. McNamara used phrases such as imposing "a high price tag"[107] on Hanoi's war effort, but did not foresee systemic effects such as crippling the economy. Former presidential advisor McGeorge Bundy had initially been optimistic about bombing's prospects, but later grew highly skeptical of its economic potential. He seemed to understand strategic bombing as a form of economic warfare. In a 1967 letter to the President, he endorsed "tactical bombing" of communications, troop concentrations, and airfields, but said, "It is strategic bombing that seems both unproductive and unwise." He thought strategic bombing could not seriously damage a primitive country like Vietnam, that the U.S. was hitting economic facilities such as power plants "mainly because we have 'run out' of other targets," and feared strategic bombing would divide American public opinion and distract attention from the struggle in the

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[104] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 204.
[105] Rolling Thunder Digest, Jan. – Mar. 1967, p. 9.
[106] Ginsburgh, OHI transcript, p. 60.
[107] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 278.

South. Bundy thought existing public support for bombing "rests upon an erroneous belief in its effectiveness as a means to end the war."[108]

Aid from other Communist countries did help North Vietnam resist bombing's economic repercussions. Before Rolling Thunder, the North had received about $100 million of economic aid per year. Combined economic and military aid rose to an estimated $420 million in 1965, $730 million in 1966, and about $1,000 million in 1967.[109] Rolling Thunder inflicted a total of only about $600 million in economic damage, so the Hanoi regime may even have enjoyed some financial gains.[110] The extensive assistance enabled the North Vietnamese to overcome economic disruptions while increasing their own defensive and offensive military capabilities.

The nature of North Vietnam's economy puzzled American leaders and complicated their attempts to apply bombing against it. Everyone acknowledged the North was not an industrial society, but drew contrasting conclusions about how much the enemy valued the limited industry that did exist. General Johnson voiced the military view when he commented, "They have a very minor industrial capacity. On the other hand, what they have is important to them, and what is important to them then should be important to us as a target."[111] Administration officials held an opposite view and did not think the North Vietnamese valued their industry just because they had so little of it.

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[108] Letter from M. Bundy to President Johnson, Spring 1967 (date uncertain), Pentagon Papers, IV.C.7.(b), vol. II, p. 27.
[109] Pentagon Papers, IV.C.7.(a), vol. I, p. 179 and IV.C 7(b), vol. II, p. 135. The 1968 figure is unknown.
[110] Michael Clodfelter, Vietnam in Military Statistics: A History of the Indochina Wars. 1772 – 1991, (Jefferson, NC: McFarland & Company, 1995), p. 222.
[111] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 402.

Assistant Secretary of Defense John McNaughton thought, "because North Vietnam's economy and organization is predominantly rural and not highly interdependent, attacks on industrial targets are not likely to contribute either to interdiction or to persuasion of the regime."[112] Characterizing the economy as "not highly interdependent" suggested bombing might destroy individual facilities, but localized results were unlikely to reverberate to other parts of the economy. Such fundamental disagreement about economic targets' values and interrelationships made difficult the task of judging bombing's potential and actual effectiveness. If industry were unimportant, then no conceivable bombing strategy against it would be effective. If it were important, bombing might be effective if conducted properly, yet fail if misapplied. Success required effects to cascade through the economy and to propagate to the enemy's military system.

The administration was reluctant to approve industrial targets for numerous reasons, including fear of Chinese or Soviet intervention and worries about civilian casualties, but personal psychological factors may also have been at work. Secretary McNamara's background made him openly contemptuous of the North's modest industrial capacity. His World War II experience as a US Army Air Force analyst gave him some credentials for judging bombing results, but Hanoi's industry was only a faint shadow of what wartime Germany or Japan had possessed. McNamara was "not at all impressed" by the North's small outputs of electricity, tires, iron, batteries, and other items. He condescendingly accounted for the sharp contrast between his attitudes about the factories

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[112] Paper by John McNaughton, Jan 18, 1966, Pentagon Papers, IV.C.7.(a), p. 34.

and those of his military advisors by noting the military men "come from different backgrounds and different experiences."[113] A former Ford Motor Company chief executive, McNamara ridiculed the North Vietnamese annual iron output by saying "I would have lost that in the backroom of what I considered a relatively small pig iron production in River Rouge," and he belittled 20,000 to 40,000 square foot vehicle repair shops commanders wanted to bomb by saying, "The smallest assembly plant I had had 1 million square feet."[114] The Secretary's remarks were oddly reminiscent of Col. Jack Broughton's disparaging portrayal of the Thai Nguyen iron and steel plant as "North Vietnam's symbolic experiment in industrialization,"[115] and implied generals who insisted on bombing such trivial facilities were not to be taken seriously because they lacked the requisite experience to evaluate industrial targets. His personal biases could only have interfered with attempts to agree with his military leaders about the real significance of enemy industry and air power's potential to affect it in ways beneficial to U.S. objectives. If the U.S. leadership could not even agree about industry's importance, they were even less likely to agree how to tell if bombing were effective against overall economic system.

Military officers asserted that the absolute scale of North Vietnamese industry was not the proper index of its strategic significance. Blending economic and interdiction rationales, General Meyers acknowledged industrial output was minuscule by American standards, but he linked imports through Haiphong with the small industrial base in a way that made industrial attacks appear necessary. As long as imports continued unhindered

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[113] Senate Preparedness Subcommittee, Part 4, Aug. 28, 1967, p. 363.
[114] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 363.

through Haiphong, he told the Stennis Committee, the North Vietnamese could indeed

make do without many of their industrial plants, but if the port were closed, their modest

industrial capacity would become an indispensable source of supplies and should therefore

be destroyed. Furthermore, he thought differences in NVA and American logistical

requirements rendered direct comparison of industrial capacities misleading. Meyers said

judging enemy supply needs by U.S. criteria was erroneous because enemy forces required

much less materiel than American units, which tended to "feed a great deal more military

hardware into a battle area than the North Vietnamese."[116] Small industrial facilities might

therefore be quite important to the enemy.

Meyers specifically challenged McNamara's contention that the two electric

battery factories that produced 300 tons of wet cells per year were "negligible in

importance."[117] Meyers stated the VC "frequently come into Saigon and buy batteries so

that they can operate their radios out in the field. ... Without a radio they have little

control of troops in battle so these batteries become very important in conducting military

operations."[118] The story's anecdotal tone raises the possibility the VC purchased the

batteries for reasons of convenience rather than necessity. Wet cell batteries are relatively

heavy, but are portable and ubiquitous enough that there was probably no way to deprive

the enemy of them, especially when the VC had no trouble acquiring comparably heavy

[115] Col. Jack Broughton, Thud Ridge, (Philadelphia and New York: J. B. Lippincott Co., 1969), p. 138.
[116] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 488.
[117] Senate Preparedness Subcommittee, Part 4, Aug. 28, 1967, p. 361.
[118] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 490.

guns and ammunition. Nevertheless, Meyers was suggesting how destroying even small factories might cause a ripple effect from the economic to the military spheres.

Chapter 5 showed American officials' almost unanimous disinterest in comparing the dollar cost of bombing to the dollar value of targets destroyed, but a process known as systems analysis attempted a more comprehensive economic cost effectiveness assessment – at least from the American perspective. Systems analysts used advanced numerical techniques and computers to find optimum cost-benefit solutions to all sorts of military problems, including bombing. Secretary McNamara was a leading advocate of the technique and maintained a systems analysis branch at the Department of Defense. He had a reputation for treating complex military problems much as he had treated financial problems as a Ford executive, but his actual attitude was certainly more sophisticated. Military officials were skeptical of systems analysis and feared the technique overrode judgments based on practical experience. Air Force Chief of Staff Gen. McConnell also employed systems analysts, but thought their proper role was to study a problem, "looking at it from all angles, and coming up with the answer in terms of effectiveness; not necessarily cost effectiveness, because sometimes you want effectiveness that'll cost more than lesser effectiveness will cost."[119] Once systems analysts had made their calculations, McConnell thought they should give their results to policy makers who would then decide what to do. McConnell argued the method had been misused because,

> Systems analysis gradually grew into an outfit that was dictating policy and strategy … And in an attempt to save money, they would come up with

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[119] McConnell, OHI transcript, Aug. 28, 1969, p. 32.

what they called cost effectiveness proposals. They would demonstrate that you could do just as well with this piece of equipment, and this strategy and these tactics as you could with a superior piece of equipment and different strategy and different tactics. Of course, it wasn't true. But on the basis of saving money, it was bought and it was not right.[120]

Systems analysis was more concerned with cost efficiency than military effectiveness. Analyses also emphasized the American side of the cost equation and paid less attention to what the enemy was doing or how he might respond. War is an interaction between thinking, adapting forces. By viewing war as a mathematical model, systems analysts risked missing an important part of the dynamic governing the bombing. Air Force leaders understood bombing was a financially expensive strategy option difficult to justify financially, so they insisted it be judged according to additional criteria. Systems analysis had some utility, but was not a reliable method by which to evaluate bombing.

Applying systems-oriented criteria to bombing assessment yielded both advantages and disadvantages. Conceptualizing targets as system components promised better overall understanding of results than might have been possible with simpler metrics such as target counting. However, POL, transportation, and economic systems are highly complex. The North Vietnamese economy proved especially hard to understand well enough for bombing to exert system-wide effects beneficial to the American cause.

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[120] McConnell, OHI transcript, Aug. 28, 1969, p. 32.

CHAPTER 7 - HEADQUARTERS ASSESSMENT: DEFENSIVE AND PREVENTIVE CRITERIA

Admiral Sharp insisted Rolling Thunder was offensive because "the enemy is forced to react at places and times of our choosing."[1] Americans did decide where and when to bomb, but did not try to eliminate the enemy's offensive warfare capability. Hanoi decided how much war material to import and send south while the U.S. reacted by trying to stem the flow. The aphorism "the best defense is a good offense" may characterize an offensive posture's defensive byproducts, but officials placed such a heavy emphasis upon defensive and preventive criteria that calling Rolling Thunder an offensive implied a degree of control over the military situation the U.S. did not exercise. Chapter 6 explained how commanders partially justified interdiction negatively by claiming its ability to reduce supplies and delay plans. Commanders used additional defensive and preventive criteria when judging results. Some indicators reflected a desire to avoid undesirable outcomes rather than to take the fight to the enemy and defeat them in a traditional sense.

Bombing to Save Lives

One way bombing acquired a defensive character was when air leaders said it saved lives – particularly the lives of American ground troops. They said less about saving

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[1] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 1, Aug. 9, 1967, p. 7. (Cited hereafter as "Senate Preparedness Subcommittee.")

aircrew lives. Chapter 6 mentioned that commanders listed increased ground troop casualties as one likely negative consequence of reducing aerial interdiction. Commanders also portrayed saving lives as a positive contribution the overall campaign could make. As Admiral Sharp explained, "The armed reconnaissance ... is worthwhile because it prevents these people getting a free ride in sending materials down there ... this certainly is saving the lives of U.S. troops and the Vietnamese."[2] When Senator Margaret Chase Smith asked Admiral Sharp if "a reduction or restriction of the bombing of the north would result in increased casualties of allied troops in the south because of the increased support the enemy would receive," the Admiral agreed, stating, "certainly any lessening of the attack any place in North Vietnam is going to result in increased infiltration and increased casualties" and conversely "A greater [bombing] effort is likely to result in less casualties."[3] The JCS members responded similarly when Senator Smith asked them the same question during the Stennis Committee hearings.

Senior officers' opinions about bombing and casualties did not waver. Adm. Sharp concluded during Rolling Thunder's final months that the entire campaign of fixed target bombing and armed reconnaissance had prevented "considerably heavier [U.S.] casualties at a smaller cost to the enemy," so "the bombing of North Vietnam, as an essential element of the overall strategy, was clearly successful in fulfilling its purposes."[4] Air Force Chief of Staff Gen. McConnell remarked in 1970 that the military's recommended

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[2] Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 73.
[3] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, pp. 15-16.
[4] Adm. U. S. G. Sharp, and Gen. W. C Westmoreland, Report on the War in Vietnam (as of 30 June 1968), (Washington, D.C.: U.S. Gov't Printing Office, 1969), p. 54.

bombing program "could also have saved many American lives because there wouldn't

have been any supplies down there to support the enemy and he couldn't very well have

fought. He wouldn't have had any bullets; he wouldn't have had any ack-ack [AAA]; he

wouldn't have had any chow. The fact is he couldn't even have gotten there."[5]

The belief that vigorous bombing would save the lives of American ground troops

was unanimous among top commanders, but they did not extend the claim to aircrew

lives. Within senior policy making circles, worries about American casualties may have

been subdued at first, but increased over time. A RAND Corporation study written after

the war found that "There are few indications that the casualty question was a critical

consideration influencing any major aspect of the decision process" among administration

or military leaders when the U.S. started Rolling Thunder and began extensive ground

force deployments in 1965. As mounting casualties eroded public support for the war,

political leaders reappraised their positions. The RAND study said that by 1967, Assistant

Secretary of Defense John McNaughton and National Security Advisor Walt Rostow were

listing the prospect of reduced aircrew casualties as one reason to scale back Rolling

Thunder.[6] Air commanders' attitudes proved less changeable. A PACOM report

published in 1967 acknowledged aircrew losses during attacks against strongly defended

areas were heavy, but "did not recommend reducing operations to reduce losses."[7] Pacific

[5] Gen. John P. McConnell, OHI transcript, Nov. 4, 1970, K239.0512-371, in USAF Collection, AFHRA, p. 14.
[6] Mark Lorell and Charles Kelley, Jr., Casualties, Public Opinion, and Presidential Policy During the Vietnam War, RAND Corporation, R-3060-AF, 1985, pp. 54 and 66-67.
[7] Headquarters PACOM, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, July 1965 - December 1966," p. 90. (Cited hereafter as "CHECO Report" followed by title.)

Air Forces Commander Gen. Harris noted in early 1967, "we have had relatively serious loss rates," but said, "I think the targets and their destruction warrant the losses."[8] Commanders were not reckless with their aircrews' lives, but they accepted the view that some sacrifices were the unavoidable price of a successful bombing campaign.

Reducing American casualties was a popular justification for more heavily bombing North Vietnam and interdicting transportation routes, but the argument had troublesome implications. In effect, justifying bombing by saying it reduced casualties blunted Rolling Thunder's offensive edge. Offensives entail aggressive action to achieve objectives, preferably at minimum cost, but saving lives is secondary to achieving the objectives. An offensive that fails to achieve its purpose, but results in no casualties is still a failure. Air commanders evidently accepted that standard for their own pilots, but rarely said heavier bombing could have meant trading higher aircrew losses for a possibly larger offsetting reduction in ground troop losses or, alternatively, that reduced air attacks could have spared aircrews at the possible expense of ground troops.

Justifying bombing as a means to save ground troops raised other problems. Perhaps air leaders were willing to sacrifice their own men to save ground troops, but they may also have been exploiting administration worries about rising casualties to marshal political support for Rolling Thunder. Bombing normally exposed far fewer men to enemy fire than ground combat, so even large aircrew losses would have translated into relatively few casualties. The political situation may have induced commanders to resort to a

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[8] Gen. Hunter Harris, OHI transcript, Feb. 8, 1967, K239.0512-377, in USAF Collection, AFHRA, p. 39.

bombing effectiveness justification they might not have used under different conditions.

Furthermore, casualties suffered can be counted with precision, but lives saved can only be inferred, providing another example of bombing's reputed ability to prevent undesired events. Attempts to measure effectiveness by using unprovable statistics about lives saved diverted attention even further away from the campaign's officially offensive purpose. Bombing became a way to outlast the enemy in a war of attrition and avoid defeat rather than a way to seize the initiative, take the fight to the enemy, and win the war.

Secretary McNamara disagreed with his senior commanders over bombing's linkage to American casualties as he did with so many other strongly held military opinions. The Secretary maintained, "I have seen no evidence of any kind submitted by any agency ... that indicates that an accelerated campaign of air attacks against the North in the past would have reduced our casualties in the South, and I have seen considerable evidence that points to the opposite conclusion."[9] He did not elaborate on the contrary evidence, but implied that the administration's graduated strategy might have saved lives compared to the military's recommended "accelerated" strategy, so graduated bombing was helping reduce casualties during the protracted ground defense of the South. McNamara was also more willing than the air commanders to cite saving aircrew lives as a reason not to bomb targets. He justified some disapprovals of recommended targets by pointing out the heavy aircrew losses the attacks would likely entail by saying, "I am Secretary of Defense and I am responsible for lives and I am not about to recommend the

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[9] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 286.

loss of American lives in relation to those targets."[10] Taking such a position suggested the

Secretary was taking the moral high ground and defending aircrews against their

commanders' reckless wishes to waste lives striking unimportant targets.

However, McNamara's concern with saving aircrew lives by disapproving some

fixed targets contrasted with his willingness to send many other sorties on armed

reconnaissance missions that, because of administration-imposed restrictions, were

sometimes channeled into short, predictable, and heavily defended routes such as the

"Slaughter Alley" railroad segment. Armed recce in lightly defended areas absorbed even

more sorties, exposing many pilots to occasional hostile fire as they searched for widely

dispersed targets. Worrying about the risks pilots faced when bombing a few targets while

allowing many more pilots to risk their lives on missions the Secretary himself thought

unlikely to do more than place "a high price tag" on Hanoi's war effort was

contradictory.[11] If McNamara were really interested in saving aircrew lives, he would

have advocated strikes against the relatively few lucrative targets rather than the many

lesser ones. McNamara was an expert at statistics, yet, like the generals, he resorted to

unprovable speculations about saving lives when such methods served his purpose.

Whether saving aircrew's lives drove his targeting recommendations or was merely a

convenient justification for decisions he made based on other criteria is unclear.

Secretary of the Air Force Harold Brown disagreed with McNamara about

bombing's life-saving potential. Brown thought Rolling Thunder supported ground

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[10] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 302.
[11] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 278.

fighting in the South and noted that enemy attacks by battalion and larger sized units in

South Vietnam had declined drastically by 1966. Enemy casualties had risen while U.S.

casualty rates had declined. He considered those facts the proper basis for judging the

campaign's effectiveness.[12]

The dispute about bombing's connection with American casualties also influenced

assessments of how many troops were needed in Vietnam. Sending additional soldiers

was politically controversial, but bombing seemed a way to replace some troops. In 1966,

Adm. Sharp contended that ground forces would need to be increased unless Rolling

Thunder were intensified.[13] During 1967 Senate hearings, he concurred with Senator

Symington's statement that "if bombing efforts were to be diminished, it would be

necessary to increase the troops needed in South Vietnam."[14] Left unstated was the

corollary that intensified bombing might decrease troop needs. Fewer soldiers in the war

zone would presumably mean fewer casualties, creating an indirect way for bombing to

save American lives. General McConnell implied as much when he said, "I think it [air

power] has saved innumerable American and Allied lives and was certainly responsible for

not having more troops over there than we did have, even though in terms of being able to

go North, the restrictions imposed on it were very severe."[15] Major General Ginsburgh,

JCS liaison to the White House, made a similar contention in 1971 when he said that if the

JCS's recommended bombing program had been carried out in 1965 or 1966, "I believe

[12] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 126.
[13] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 68.
[14] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 34.
[15] Gen. John P. McConnell, OHI transcript, Aug. 28, 1969, K239.0512-1190, in USAF Collection,

that a decision [to the war] most probably would have been reached before our ground

forces ever came close to reaching the peak strengths they later did."[16]

Most speculations about troop requirements were only qualitative, but McConnell

quantified bombing's ability to replace ground troops. He told the Stennis Committee that

Rolling Thunder had obviated deploying "perhaps more than 800,000" additional troops.[17]

He stated during a 1970 interview that 100,000 U.S. ground troops - rather than the over

500,000 actually sent - would have been enough to hold the South if the President had

followed the military's recommended bombing program.[18] Military officials were offering

political leaders a way to judge bombing by the amount of domestic political strife avoided

rather than the amount of damage inflicted on the enemy.

Senior officers occasionally evoked the supposed link between bombing the North,

saving U.S. lives, and reducing troop requirements to criticize political restrictions on

Rolling Thunder. Some of the remarks cited above at least implicitly criticized

administration policy or potential policy changes, but other officers made more explicit

remarks about bombing to save American lives. Brigadier General Philpott used troop

requirement and casualty projections to argue against the administration's bombing pauses

when he claimed, "granting [the enemy] unhindered access to resupply lines in this manner

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AFHRA, p. 23.

[16] Maj. Gen. Robert N. Ginsburgh, OHI transcript, May 26, 1971, K239.0512-477, in USAF Collection, AFHRA, p. 22.

[17] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 202.

[18] McConnell, OHI transcript, Nov. 4, 1970, pp. 3, 5, and 10.

can only result in increasing free world troop requirements and casualties to almost

unacceptable levels."[19]

The generals did not officially consider the domestic political repercussions of their

troop deployment and bombing recommendations, but even JCS Chairman and Army

officer Gen. Wheeler found military reasons to advocate bombing as a partial substitute for

troop deployments. Most ground fighting during Rolling Thunder involved sporadic

combat against VC guerrillas. Bombing the North might not have appeared to harm the

VC, but Wheeler argued otherwise. When Senator Jack Miller asked him if "while it is

true that bombing does not directly affect the guerrilla infrastructure, it can have a

profound indirect and perhaps even a decisive effect on the guerrilla infrastructure,"

Wheeler agreed.[20] Left unsaid was exactly what "profound indirect" or "decisive" meant.

Miller and Wheeler did not explicitly mention Rolling Thunder, nor did they specify the

targets or bombing methods that supposedly undermined the guerrillas. The point was

that bombing could supposedly reduce the need for U.S. troops to dislodge guerrillas

through costly ground combat. Touting Rolling Thunder as an offensive that was taking

the war to the enemy while pointing to its domestic political expediency and "profound

indirect" effects on guerrillas muddled attempts to judge its effectiveness.

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[19] Brig. Gen. Jammie M. Philpott, End-of-Tour Report, Dec. 6, 1967, K740.131, in USAF Collection, AFHRA, p. 6.

[20] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, pp. 175-176. In Part 5, p. 435, Gen. Johnson defined "guerrilla infrastructure" as "the Vietcong governing element within the hamlets and the villages and the districts and the provinces of South Vietnam, and it consists of a Vietcong controlled counterpart government for a great portion of South Vietnam." Presumably, Gen. Wheeler's definition was similar.

Minimizing American casualties was desirable, but the administration wanted to avoid North Vietnamese civilian casualties at almost any cost. Some USAF leaders thought the administration's concern with avoiding civilian casualties had become a pernicious obsession. General Meyers agreed with Senator Symington's scathing assessment that the Johnson Administration's bombing policy meant political leaders "appeared more interested (a) in protecting North Vietnamese civilians than they were in having the mission accomplished successfully, and (b), were in effect more interested in preserving the lives of North Vietnamese people than saving the lives of our own American pilots."[21] The strong desire to avoid killing enemy civilians permeated the campaign. The oft repeated assertion that aircraft bombed only military targets reflected extreme American sensitivity to charges that civilian casualties negated the bombing's military usefulness. Military officials also wanted to minimize civilian casualties, but applied less stringent standards when weighing the military necessity of striking targets against the risk to civilians. They did not advocate indiscriminate bombing, but argued the welfare of U.S. servicemen should take precedence over that of enemy civilians.

Civilian casualty predictions were a critical consideration when the administration was deciding whether to approve targets – such as the POL storage areas discussed earlier – for strike. Intelligence agencies exerted great efforts both to predict casualties for proposed missions and to estimate those actually inflicted by past ones. Variables influencing casualty estimates included a target's proximity to populated areas, the

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[21] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, pp. 511-512.

intensity of air defenses, and the numbers and types of ordnance to be used. The administration rejected even militarily valid targets, leading the USAF Chief of Staff to explain, "if there was any danger of even slight civilian casualties, we weren't allowed to attack those targets, regardless of how important it appeared to us from a military standpoint that they should be attacked."[22] A Headquarters, USAF report also noted, "Military targets of significant importance have been passed-by primarily because of target geographical location in relation to civilian populated areas and the concern over civilian casualties."[23] Estimating casualties actually inflicted relied on post-strike photo analysis performed by agencies such as the DIA, supplemented by North Vietnamese propaganda claims and reports from foreign observers. Inevitably, both predictions and post strike estimates were little better than educated guesses, meaning one of the most decisive political influences on judging bombing effectiveness was unmeasurable.

Exact information about total casualties attributable to Rolling Thunder was (and remains) unavailable, but the U.S. estimated 13,000 for 1965 and 23,000 or 24,000 in 1966, 80% of whom were civilians.[24] The author has not found itemized estimates for 1967 or 1968, but one source speculated that a total of about 52,000 civilians died during all of Rolling Thunder.[25] The 1968 toll was almost certainly much lower that the 1967 figure due to the geographic restrictions imposed on bombing in early 1968.

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[22] McConnell, OHI transcript, Aug. 28, 1969, p. 17.

[23] Headquarters, USAF, "Air Operations - North Vietnam," Apr. 27, 1967, K143.5072-90, in USAF Collection, AFHRA, Part III, p. 2.

[24] U.S. Department of Defense, United States - GVN Relations, (Washington, D.C.: Gov't Printing Office, 1972), IV.C.7.(a), vol. 1, p. 178. (Cited hereafter as "Pentagon Papers.")

[25] Michael Clodfelter, Vietnam in Military Statistics: A History of the Indochina Wars, 1772 – 1991,

Regardless of the estimates, bombs that struck civilian areas created tangible and serious political repercussions. The December 1966 attacks on the Hanoi railroad yards sparked intense protests from Communist countries about the resulting civilian casualties and damage to nearby embassies. The domestic and international furor probably induced President Johnson to ban all attacks within 10 miles of Hanoi without specific Presidential authorization. When New York Times reporter Harrison Salisbury visited Hanoi from late 1966 to early 1967, he wrote articles corroborating Hanoi's allegations of civilian casualties, placing additional pressure on the President who reiterated that the bombing was directed against legitimate military targets.

Civilian casualty worries influenced choices about which types of airplanes to use. Air Force B-52 bombers equipped with ground-mapping radar were especially well suited to bad weather and nighttime conditions during which fighters were least able to hit targets, but B-52 attacks in populated areas magnified civilian casualty risks. Since "The concern for the lives of the civilian populace is overriding in almost everything up there," tactical fighters were more acceptable for such attacks than strategic bombers.[26] Besides civilian casualty worries, planners feared the strong antiaircraft defenses in heavily populated areas might have inflicted intolerable losses on B-52s.

Air defenses were also a danger to North Vietnamese civilians. Anti-aircraft munitions that fell back to earth caused some of the damage attributed to American bombs, but the North Vietnamese evidently fired regardless of the risks to their own

(Jefferson, NC: McFarland & Company, 1995), p. 222.
[26] Lt. Col. William H. Greenhalgh, OHI transcript, Oct. 11, 1967, K239.0512-40, in USAF Collection,

people. Antiaircraft missiles and shells that did not detonate in the air were apt to explode

when they fell back to earth, but Gen. Momyer noted, "Unfortunately, we were unable to

measure the self-inflicted damage from such firings."[27] The Communists were perfectly

willing to blame the U.S. for all damage to civilian areas.

One peculiar aspect of civilian casualty concerns was the different standards

applied to bombing in North Vietnam compared to South Vietnam. North Vietnamese

civilian casualties were evidently much more politically sensitive than South Vietnamese

civilian casualties. Admiral Sharp said "if you had Viet Cong in a town in South Vietnam

you could go in and flatten the town without doing any more than just giving the order. ...

On the other hand, if you wanted to go into North Vietnam you had to be very careful to

avoid hitting any of the towns even though they were filled with the enemy."[28]

The overwhelming desire to avoid enemy civilian casualties reflected important

political and moral concerns, but detracted from Rolling Thunder's ostensibly offensive

purpose of taking the war to the enemy and persuading the Hanoi regime to stop fighting

in South Vietnam.

Diverting Enemy Resources to Defensive Tasks and Repairs

Diverting manpower and materiel resources into defensive tasks has been a

traditional bombing justification, and commanders considered it an important success

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AFHRA, p. 35.
[27] Gen. William W. Momyer, Air Power in Three Wars. (Washington, D.C.: Department of the Air Force, 1978), p. 180.
[28] Adm. U. S. G. Sharp, OHI transcript, Feb. 19, 1971, K239.0512-409, in USAF Collection, AFHRA, p.

indicator during Rolling Thunder. Besides the obvious economic penalties imposed,

forcing the enemy into a defensive posture underscores bombing's offensive nature.

General Wheeler felt "the air campaign has made an essential contribution to the war in

Southeast Asia by forcing the enemy to mobilize; to divert large quantities of manpower

and resources to maintain lines of communication, and to man an extensive air and coastal

defense system."[29] Admiral Sharp said, "Repair, reconstruction, and dispersal programs

are consuming increasing human and material resources which otherwise would contribute

to the Communist's combat capability in South Vietnam."[30]

Manpower issues seemed particularly significant to U.S. analysts and military

commanders. A RAND Corporation study done for the USAF called manpower

diversion, "Probably the most tangible manifestation of the strains experienced in 1965,

and the source of greatest concern to the Hanoi authorities."[31] In 1967, Adm.Sharp called

manpower diversion a result "we believe is more important than we generally take credit

for"[32] since the North seemed to be running short of people. He also observed, "We

believe about 500,000 men have been diverted to such activities" as repair, reconstruction,

and other defense tasks.[33] Other officials quoted comparable manpower diversion figures.

A PACAF report argued diversions exacerbated economic distress by depriving farms of

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[29] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 201.

[30] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 6.

[31] Oleg Hoeffding, Bombing North Vietnam: An Appraisal of Economic and Political Effects, RAND Corporation Memorandum RM-5213-1-ISA, Dec. 1966, p. 6.

[32] Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 97.

[33] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 6. Gen. McConnell made similar remarks on Aug. 22, 1967 - see p. 204.

workers and requiring a six-fold increase in agricultural imports between 1966 and 1967

to compensate for the lost food production.[34] General Momyer claimed enemy manpower

assigned to repairs and air defense "were troops who could have been in combat units."[35]

Presumably, such diversions might also have saved American lives by reducing the number

of soldiers available to fight American troops.

Closer scrutiny of North Vietnamese manpower usage suggests the diversion effect

was more complex than most commanders thought. A RAND study estimated damage

repair, POL dispersal, civil defense construction, urban evacuation, and other defense

tasks may have occupied roughly 1.5 million people or 10 to 15 percent of the adult, able-

bodied population. Plenty of peasant laborers were available, and about 40,000 Chinese

railroad workers had entered the country, but skilled, educated leadership was indeed

scarce. Agriculture provided most laborers, but the farm workforce shrank less than the

statistics implied because some workers performed military duties, yet were not wholly

removed from agricultural work. Nevertheless, the RAND study ambiguously stated, "the

effects of manpower diversion on the farm labor force have been neither negligible nor

critical." While expressing doubts that North Vietnam faced serious labor shortages, the

study simultaneously criticized the idea that "a backward, overpopulated farm economy of

this type disposes of vast [manpower] reserves for all kinds of simple nonfarm tasks

without detriment to production."[36] The report hedged its interpretations in the "inexact

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[34] CHECO Report, "Rolling Thunder, January 1967 - November 1968," pp. 13-14.
[35] Momyer, Air Power in Three Wars, p. 190.
[36] Hoeffding, p. 10.

and impressionistic language" so common in such documents, but the bottom line was that the North still had enough manpower for needed economic and military functions.

The ratio of the amount of bombing and the amount of resource diversion was a potentially important effectiveness determinant. Military and civilian officials agreed not to judge success by comparing the dollar cost of bombing with the dollar value of targets destroyed; however, comparing the bombing effort to enemy resource diversions was more contentious. Officials disagreed about the elasticity of bombing's resource diversion effects. Air commanders thought the diversion's magnitude varied directly with bombing intensity up to some point of diminishing returns, but did not think the campaign had reached that point. Therefore, escalating the campaign as the military had been advising all along by striking more vital targets and doing so more persistently would impose additional costly resource diversions.

A countervailing opinion held that the campaign had already passed the point of diminishing returns, so additional resource diversions to repair lines of communication would no longer increase with heavier bombing. Secretary McNamara thought Rolling Thunder had reached diminishing returns by October 1966 when he told the President, "Now that the lines of communication have been manned, … it is doubtful that either a large increase or decrease in our interdiction sorties would substantially change the cost to the enemy of maintaining the roads, railroads, and waterways or affect whether they are operational." McNamara thought the inelasticity of the enemy response meant considerable resource diversion would result even if only occasional attacks were made in heavily defended areas around Hanoi "to keep North Vietnam off balance and to require

her to pay almost the full cost by maintaining her repair crews in place."[37] The following

month, he noted that several hundred thousand people were maintaining transportation

routes, but he concluded, "there is no indication that recent sortie increases have caused

further increases in the number of these personnel. Once the enemy system can repair

road cuts and damaged bridges in a few hours, as it has demonstrated it can, additional

sorties may work this system harder but are unlikely to cause a significant increase in its

costs."[38] Chapter 5 discussed McNamara's closely related ideas about the declining

marginal utility of increasing sortie rates. An inelastic response to bombing supported

either the graduated or reduced campaign McNamara was advocating by late 1966.

A December 1966 RAND report diverged from the prevailing Air Force view and

reached conclusions similar to McNamara's. The report divided bombing-induced

resource diversions into three categories it labeled investment, replacement and repair, and

operation of war-related programs. Investment activities included anti-aircraft defense

infrastructure, road building, and training. Those defensive activities exacted high initial

costs, but produced paybacks later on. For example, graduated bombing escalation

afforded time for unskilled people and organizations to gain valuable experience under

wartime conditions. Conversely, diversions to meet replacement and repair costs were

low when bombing began on a small scale, but increased in proportion to bombing

intensity. Operation of war-related programs consumed considerable human and material

resources during initial mobilization to defend against bombing, but resource demands

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[37] Memo, McNamara to the President, Oct. 1966, Pentagon Papers, IV.C.7(a), vol. I, pp. 163-166.
[38] McNamara's justification for FY 1967 SEA Supplemental Appropriation, Nov. 1966, Pentagon Papers,

then stabilized. The RAND study said the net result was that once Rolling Thunder

became a fairly predictable routine, the North's need to divert additional resources in

response to any escalation was not very great. The Hanoi government was also able to

import any materials needed to compensate for serious shortfalls, so communist officials

were not necessarily worried about collapsing under the bombing campaign.

Damage repair was a form of resource diversion, but contradictory interpretations

were commonplace. On one level, most observers agreed that when the enemy rebuilt

damaged facilities, those facilities must have been important. A PACOM report noted

"persistent efforts to repair and rebuild rail interdictions and increased aircraft defenses are

further evidence of the importance placed on maintaining the vital northern railway

network."[39] A June 1968 CIA/DIA report also said that electric plant repair "continues to

demonstrate the importance of this branch of industry to the North Vietnamese

economy."[40] Disagreements arose regarding other repair activities, however.

The length of time the taken to repair damage proved a highly malleable

effectiveness criterion. Rapid repair could mean either effective or ineffective bombing.

When B-52s dropped over 600 tons of bombs to block roads through Mu Gia Pass one

day in 1966, a PACAF report noted, "Photography revealed that 26 1/2 hours after the

strike, all craters were filled in and there were tracks across them. The speed with which

the road was made serviceable is an indication of the strategic value of this pass to the

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IV.C.7.(a), vol. I, p. 175.

[39] Headquarters PACOM, Operations Division, Rolling Thunder Digest, Apr. – Jun. 1967, p. 28.

[40] CIA/DIA, An Appraisal of the Bombing of North Vietnam, Jun. 30, 1968, p. 14. (Cited hereafter as "CIA/DIA Appraisal.")

enemy."[41] The report did not conclude the bombing was ineffective because the road cut

had lasted such a short time, but implied instead that the proper response was to bomb the

pass more often to keep such a vital road closed. A Seventh AF planner also emphasized

the importance "of finding out which areas he [the enemy] considered most important as

evidenced by the rapid repair which took place after strikes."[42]

Claims that rapid repair denoted proper target selection and thus effective bombing

were the exception rather than the rule. In most cases, long repair times meant effective

bombing. Rolling Thunder Digest estimated repair times for fixed targets such as bridges

and industrial plants, consistently presenting long estimated repair times as signs of severe

damage and thus of successful attacks.[43] Chapter 6 described USAF reports that boasted

about how long the enemy took to reopen damaged rail lines. Plainly, the longer a line

stayed closed, the more successful the strike had been. At the flying unit level, pilots did

not like to risk their lives on missions only to hear afterwards that the enemy had repaired

the damage within hours. The speed of repairs therefore seemed to be a chameleon-like

measurement adaptable to supporting effectiveness claims in almost any case, but long

repair times were usually deemed a surer sign of good results than short times.

The seemingly obvious conclusion that when damage repair took a long time, the

attack was successful oversimplifies reality. Lack of repair might be conceptualized as

repairs performed at an extremely slow rate and could imply either effectiveness or

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[41] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 50.

[42] Lt. Col. David P. Blackbird, OHI transcript, Nov. 6, 1969, K239.0512-302, in USAF Collection, AFHRA, p. 17.

[43] See Rolling Thunder Digest, all editions, Operations Highlights sections.

ineffectiveness, depending on who made the assessment. Civilian and military officials

reached diametrically opposed conclusions when the enemy did not repair damage.

Secretary McNamara said the North Vietnamese "aren't making any attempt to

reconstruct most of the so-called industrial targets we hit, which implies that they aren't

very important to them and that they are able to substitute imports for them."[44]

Conversely, PACAF suggested, "Apparently the enemy's manpower resources were being

heavily taxed; some destroyed targets showed no signs of repair for weeks."[45] A 1967

PACOM report concluded,

> From BDA photos, it is apparent that the rail campaign has had a severe
> impact on NVN. Recent visual and photographic reports indicate that
> repair efforts have been unable to cope with the sustained strike activity.
> Many rail yards are devastated and only necessary repair efforts to maintain
> through service have been made. Scores of unserviceable and destroyed
> rolling stock remained in place for weeks at a time with no apparent effort
> to salvage or repair them.[46]

A Seventh AF planner expressed an intermediate view when he explained how

interdiction closed roads for various lengths of time, but "We were never able to

determine whether this was due to our own effectiveness in bombing or lack of enemy

interest in repairing the damage."[47]

Chapter 6 explained how military officials measured results negatively by

observing enemy behavior during bombing pauses to see how well aerial interdiction had

been working. Air commanders applied comparable negative assessment techniques after

[44] Senate Preparedness Subcommittee, Part 4, Aug. 28, 1967, p. 367.
[45] CHECO Report, "Rolling Thunder, January 1967 - November 1968," p. 7.
[46] Rolling Thunder Digest, Jul. – Sep. 1967, p. 22.
[47] Blackbird, OHI transcript, p. 28.

the President circumscribed bombing in April 1968. When bombing ended north of the 19th parallel, military officials thought subsequent damage restoration efforts revealed how effective the bombing had been. Noting extensive repair efforts, PACOM concluded, "Hanoi apparently is confident that the bombing will not resume since the regeneration of many key targets that heretofore had not received any attention is now proceeding at a rapid pace."[48] Unlike McNamara's view that the enemy had not bothered to repair industrial targets because the facilities were nonessential, the PACOM assessment suggested bombing had deterred the North Vietnamese from restoring facilities as long as they knew the U.S. could simply destroy them again. Therefore, waiting to make repairs until after Rolling Thunder had ended supposedly demonstrated that bombing had given the U.S. some control over enemy behavior.

Damage repair decisions probably depended on too many unknown variables to be a reliable effectiveness indicator. Distinguishing between a desire to restore damaged facilities and the physical capacity to make repairs was almost impossible. Most observers agreed the enemy would not have repaired something unless he valued it, but interpreting the speed of repair was more difficult. Absence of repair was even more ambiguous. Some choices about what to restore and when to do so may have been based on expediency rather than necessity, but analysts had no firm basis for divining enemy intentions. The capacity to attribute diametrically opposed interpretations to any repair activity (including no activity) raises the question of whether repair efforts were an input

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[48] Rolling Thunder Digest, Apr. – Jun. 1968, p. 9.

to the assessment process or a polemical device used to justify preexisting opinions. At a minimum, judging success by enemy repair efforts would have been a highly speculative endeavor unless the North Vietnamese were clearly not fixing damage because they were on the brink of defeat.

Air Defenses and Aircraft Loss Rates

If diverting enemy assets to defensive functions connoted a successful campaign, then it was a mixed blessing because American planes faced stiffer opposition, but the magnitude of enemy defensive activities became a meaningful reflection of bombing's success. Diverting resources to defenses affected both sides. American attacks diverted some Communist resources to air defenses, which in turn diverted some U.S. planes to defense suppression. Determining which side enjoyed a net gain was debatable.

The North skillfully used both active and passive defenses. Active air defenses consisted of an integrated system of SAMs, AAA, and MiG interceptor aircraft. Each weapon type complemented the others. The SAMs were best against high-flying planes, but AAA was deadliest at low altitude. The MiGs made few kills, but required constant defensive preparations that distracted American units from bombing tasks. Passive defenses included camouflage and dispersal. Active defenses were obvious and attracted constant attention because they could destroy planes. Passive defenses were by definition unobtrusive and were less often discussed by American officials. The North Vietnamese were masters of camouflage, and their successful dispersal of POL and other supplies mitigated the damage they suffered even when the Americans did find hidden facilities.

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Although air defenses were normally obstacles to bombing, commanders also found ways to take advantage of them. An example was the belief that air defenses sometimes revealed hidden targets. Seventh AF planner Lt. Col. Blackbird said,

> [W]e discovered in using the ground fire reports that these occasionally became tip-offs to new target areas – particularly new truck parks or storage areas. We would discover that we were getting ground fire in a particular area where we had no significant targets and were conducting no significant strike activity. But, because of the extensive ground fire in the area, this became a clue for us to concentrate reconnaissance, both photo and visual, and occasionally road-watch efforts in the area, to find out what the enemy was trying to defend. In several cases we did discover large storage areas, truck parks, or vehicle repair areas that the enemy had built anew and heavily camouflaged or otherwise concealed in caves and so forth, that we had not known about and perhaps would not have discovered. ... the initial tip-off was the increase in ground fire and, in many cases, pointing almost directly to the particular target area.[49]

Chapter 3 presented a bifurcated aircrew attitude toward judging target value by enemy defensive fire. Crews disapproved of judging fixed target value that way, but agreed ground fire was a good indication armed recce targets were nearby. Blackbird was referring to armed reconnaissance targets, but whether headquarters differentiated between fixed and armed recce targets the way some aircrews did remains unclear. Also, if Lt. Col. Allison were right when he said aircrews were reluctant to report flak because of the extra paperwork involved, the flak reports might not have been as useful for revealing targets as Seventh AF thought.[50] Crews actively complained about intense AAA around fixed targets they thought had already been obliterated, but may have refrained

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[49] Blackbird, OHI transcript, pp. 17-18.
[50] See Lt. Col. Clark H. Allison, OHI tape, n.d. (circa 1970), K239.0512-298, in USAF Collection, AFHRA, as described in Chapter 3.

from reporting sporadic fire received while performing armed reconnaissance in the remote areas likely to conceal dispersed supply areas or truck parks.

Defenses did not need to assist targeting to yield potentially helpful clues about the enemy's status. The amount of antiaircraft firing occasionally became a barometer of bombing's success. Missiles and ammunition were heavy and had to be transported to air defense sites. General Momyer told the Senate in 1967 that the numbers of SAMs and AAA shells fired at U.S. planes had declined during the previous year, suggesting the enemy was "experiencing considerable problems with his logistical system. There has been a major disruption of his transportation system, and I think that he is having problems on getting those goods [antiaircraft munitions] distributed on the time schedule that he needs to keep the support of his forces going."[51] Momyer assumed that the enemy would prioritize defense against air attack so weakening defensive potency was only the tip of an iceberg and would indicate deeper problems with more mundane supply functions. Intensified air attacks might therefore trigger a dramatic enemy collapse. The prevailing trend was for SAM and AAA firing to increase over time even as the numbers of Rolling Thunder targets and sorties increased, so examples of claiming success based on weakening air defenses were rare.

Commanders portrayed defensive responses in some contradictory ways. They often argued that attacking wider areas and more targets would weaken defenses, but also

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[51] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 170. Antiaircraft firing fluctuated widely for many reasons. Admiral Sharp contradicted Momyer, stating the previous week that SAM launches were remaining steady while AAA firing was increasing. See Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 88.

found reasons to advocate concentrated attacks against limited geographic areas. A 1966

PACOM study noted that many AAA sites that used to be fully equipped with guns were

now only partly equipped. The report concluded, "It appears that as the scope of the air

offensive has increased, the enemy has found that he has more targets to defend and not

quite enough [AAA] guns to go around. Forced to expand his fire base, he has also been

forced to spread his weapons thin."[52] The report implied expanded target approvals might

compel further gun dispersal. Left unsaid was that the gun shortage might be temporary

and could end when the North imported more guns and trained more crews (as they did in

1967 and 1968); however, any AAA increases would represent additional resource

diversions to defensive functions. Conversely, narrowing the target base and geographic

area open to bombing allowed the enemy to concentrate defenses. After bombing was

confined to the southern panhandle, PACOM repeatedly noted a southward shift of

antiaircraft weapons, as the North Vietnamese became more convinced bombing would

not resume in the Hanoi – Haiphong area. The increasing hazard to aircraft in the

southern panhandle was analogous to the "slaughter alley" effect noted earlier along the

northeast rail line, but was less severe because the U.S. was able to apply extremely

intense bombing to the areas closest to South Vietnam; moreover, the North did not

defend the panhandle as tenaciously as the Hanoi – Haiphong region.

The overall volume of antiaircraft firing may have been increasing, but USAF

reports contended that concentrated attacks against some small areas were a good idea.

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[52] Rolling Thunder Digest, Oct. – Dec. 1966, p. 22.

Such attacks could beat down defenses by depleting ammunition reserves quicker than the

enemy could replace them, thereby making those areas at least temporarily safer for U.S.

warplanes. A 1967 PACAF report discussed "a major enemy defensive deficiency,"

noting, "continuous attack against confined areas soon caused the obviously limited enemy

antiaircraft munitions to become exhausted, thus permitting operations to proceed against

very lucrative targets with little enemy fire."[53] The argument sounded like a scaled-down

variation of Momyer's belief that reductions in AAA and SAM firings revealed large-scale

enemy logistical shortages. Possibly intended to support calls for more frequent raids

against targets the President approved only intermittently, PACAF's argument seemed the

opposite of PACOM's idea that unpredictably attacking numerous widely-separated

targets forced the enemy to disperse his guns too widely. Commanders might have been

using those opposing arguments to support their recommendations to attack more targets.

Military officials argued that practically any enemy air defense response

substantiated air power effectiveness and the need for heavier bombing. Ground fire did

betray some hidden targets, but the enemy could have used such firings to mislead

American planes. Despite some gun and ammunition shortages, antiaircraft weapons

proliferated and fired at increasing monthly rates as time passed. Whether dispersing

defenses by striking numerous targets or depleting anti-aircraft munitions in limited areas

by concentrating on a few targets was the more effective approach is unclear. Numerous

factors influenced air defense activities, but senior officers seemed to give their favored

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[53] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 91.

interpretations the benefit of the doubt. Effectiveness indications based on air defenses

may have been the silver lining of an otherwise dark cloud, but since the true explanations

for defensive behavior were difficult to find, the generals' claims were hard to challenge.

Commanders were obviously not content to hope anti-aircraft sites would simply

become too widely dispersed or else fire until they ran out of missiles and ammunition.

Specially modified aircraft (F-100s at first, then F-105s) called Wild Weasels specialized in

destroying SAM sites. A Wild Weasel mission was known by the code-name Iron Hand.

The SAM suppression assisted bombing missions, but Gen. Momyer noted,

> [T]he effectiveness of the flights was often debated. It was particularly
> difficult to confirm the destruction of a SAM, and some critics claimed that
> the Weasels were not effective since a relatively small number of destroyed
> SAM sites could be attributed with certainty to these flights. However, as
> much as we wanted to destroy the sites, the effectiveness of the Iron Hand
> flights must be measured against a criterion of suppression as well as one
> of … destruction. If a SAM site could be suppressed so that it couldn't
> fire against strike aircraft, the mission of the Iron Hand flight was a
> complete success.[54]

General Momyer's view emphasized achieving an effect other than outright

physical destruction and resembled Admiral Sharp's comment that armed recce sorties that

saw no vehicles were completely effective because they had denied the enemy use of a

transportation route. Suppressing SAM sites and preventing missile launches probably

saved some planes from being shot down, but there was no definitive way to quantify

planes and pilots saved. Defense suppression was an unprovable effectiveness indicator.

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[54] Momyer, Air Power in Three Wars, pp. 131-132. Text says, "suppression as well as one of one of destruction."

Claims that defenses demonstrated the campaign's effectiveness or the extent of

enemy resource diversion could not obscure the fact that the defenses' primary

consequence was to degrade bombing's success. Planners knew there were manifold ways

active defenses lowered bombing effectiveness without even damaging U.S. planes.

Heavy defenses precluded using some planes against otherwise ideal targets. Lieutenant

Colonel Greenhalgh, a Seventh AF target planner, judged B-52 strikes in the southern

panhandle highly effective in terms of accuracy and firepower, but acknowledged the

bombers' survivability over Hanoi would have been a problem.[55] Defenses also distracted

pilots, reducing delivery accuracy and causing bombs to miss their targets - or worse yet -

fall in civilian areas. Reattacking missed targets risked additional aircraft losses, and

damage to civilian areas inflamed opposition to the bombing. Sorties that suppressed

SAM and AAA sites or defended against MiGs diverted significant American resources

away from offensive tasks without but producing many contributions to Rolling Thunder's

objectives. However, military officials did not necessarily deem American resource

diversion to counteract air defenses to be a significant detraction. Air Staff planner Col.

Edelen agreed diverting bombing sorties to defense suppression reduced bombing

effectiveness, but insisted bombing was still successful and just took longer to accomplish

its purposes. He thought the graduated strategy had already sacrificed advantages such as

surprise and flexibility, so taking longer to achieve objectives made little difference.[56]

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[55] Greenhalgh, OHI transcript, p. 35.
[56] Col. Henry H. Edelen, Jr., OHI transcript, Jan. 27, 1970, K239.0512-243, in USAF Collection, AFHRA, pp. 96-97.

Forcing aircraft to jettison their ordnance was an obvious, measurable way active

defenses could detract from mission success without destroying aircraft, and commanders

kept statistics to document the phenomenon. Jettisoned bombs normally fell unarmed, but

were still a potential source of civilian casualties. Aircraft might jettison due to

mechanical failures or battle damage. The violent aerial maneuvers sometimes required to

evade SAMs could prompt crews to get rid of their bombs before reaching the target, but

PACAF claimed premature jettisoning due to SAM activity was rare.[57] Interception by

MiGs was more likely to cause aircraft to jettison to improve their maneuverability "and

thus reduce the impact of the interdiction effort," but even jettisoning due to MiG attack

was uncommon. Less than 100 sorties jettisoned bombs for any reason between January

and October 1966.[58] The 48 that jettisoned in September 1967 marked a monthly record

for that year that was double 1967's previous monthly high.[59] Those 48 sorties

represented only about 0.5% of the 8,540 September 1967 attack sorties flown.

Nevertheless, commanders saw bomb jettisoning as a way small numbers of MiGs could

offset disproportionately large American air resources without even achieving any

dramatic aerial victories. Air defenses in general – and MiGs in particular – exerted a

relatively inelastic American response. American pilots were about equally distracted

from their attacks by a few MiGs or by many and a PACAF report noted "a single feint or

firing pass caused U.S. aircraft to jettison ordnance, which neutralized the sortie."[60] Pilots

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[57] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 110.
[58] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 118.
[59] Rolling Thunder Digest, Jul. – Sep. 1967, p. 30.
[60] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 118

such as Col. Broughton insisted aircraft jettisoned less often than the PACAF report

implied, and the statistics showed jettisoning was indeed infrequent. Nevertheless, the

mere presence of defenses degraded results even if no aircraft were damaged.

The strength of active air defenses had mixed implications. The USAF preferred

not to face serious defensive opposition. Without defenses, losses would have been low

and bombing would have seemed able to achieve optimum performance. However, the

Washington political environment seemed to favor the development of strong air defenses.

A 1967 PACAF report characterized the increasingly integrated North Vietnamese air

defense system as "the most formidable one ever faced by U.S. aircraft," and noted the

defenses "belied the claims made by some critics that U.S. air operations in North Vietnam

were directed against a helpless and unsophisticated opponent."[61] Admiral Sharp went

even further, saying the North had "the most sophisticated air defense system ever faced

by any force in combat."[62] Credible air defenses helped legitimize bombing as a fair fight

against a capable foe rather than a superpower bullying a weak country. Perhaps,

commanders hoped heavier bombing could therefore have been justified politically as an

appropriate policy rather than excessive bullying.

Passive air defenses also degraded bombing effectiveness by hiding real targets,

offering fake ones, and spoofing reconnaissance, but American officials discussed them far

less frequently than active defenses. Attempts to quantify how camouflage, deception and

similar techniques degraded effectiveness were also comparatively slight. A 1968

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[61] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 123.
[62] Sharp and Westmoreland, p. 4.

PACOM report described ruses such as painting bomb craters on repaired runways to make airfields appear unserviceable. Smoke-producing devices simulated bomb hits or even launches from unoccupied SAM sites. Placing dummy equipment or leaving derelict vehicles as decoys was another common deception.[63] Chapter 3 described how pilots repeatedly bombed old wrecked trucks left in a river crossing. Air commanders knew deceptions existed, but there was no way to know how many camouflaged targets evaded detection or how many decoys were claimed as real targets destroyed.

Officials also knew that the North Vietnamese deliberately used deception to waste or distract reconnaissance efforts and discourage the use of some aircraft types. Recce flights usually preceded air strikes, so the enemy tried moving sensitive targets by night after reconnaissance flights had passed over the area. Another variation of that technique involved air defenses. According to a PACOM report, "the North Vietnamese have been able to maintain a SAM threat for some time [in RP 1] merely by setting up firing elements until they have been detected, then dismantling and dispersing the equipment. By operating in this manner, they elicit heavy reconnaissance and strike reactions at little expense to themselves and at the same time, probably hope to inhibit B-52 operations in the area."[64] A possible SAM presence would also deter FAC, airborne command and control, and other aircraft types. A small display of SAM equipment elicited a disproportionately large response that diverted sorties away from potentially more productive alternative uses.

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[63] Rolling Thunder Digest, Jan. – Mar. 1968, p. 38.
[64] Rolling Thunder Digest, Jan. – Mar. 1968, pp. 38-39.

Commanders constantly discussed active defenses, and especially delighted in recounting the intricate details of aerial dogfights with MiGs. One reason why they paid more attention to active than to passive defenses may have been that camouflage and deception were merely annoying, but the number of U.S. planes actually shot down demanded close attention. Aircraft losses were a staple effectiveness measure planners had used since the earliest days of aerial warfare and reflected the potency of enemy active defenses. Annual aircraft losses for all military services over North Vietnam were 169 in 1965, 283 in 1966, 333 in 1967, and 144 through October 1968 for a grand total of 929.[65] To compensate for large monthly variations in numbers of sorties flown, commanders typically quoted a loss rate defined as the number of sorties lost per thousand flown. General McConnell seemed pleased to cite declining loss rates of 3.2 sorties per 1,000 in 1965, 2.2 per 1000 in 1966, and 1.6 per 1,000 during the first half of 1967 despite a tripling in the annual totals of sorties flown.[66] McConnell was probably counting all Rolling Thunder sorties – not just attack sorties. Since only about half the total sorties were attack sorties, the rates would have been about twice as high if he had counted only attack sorties, but the declining trend would still have been present. The figures are hard to define precisely because, as already explained, sortie type definitions shifted over time. Additional ambiguities arose when aircraft crashed for reasons unrelated to combat, such as bad weather enroute to a landing base, but the statistics are accurate enough to permit analysis.

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[65]Data through Sep. '68 are from Rolling Thunder Digest. Oct. '68 data are from CHECO Report, "Rolling Thunder, Jan. 1967 – Nov. 1968," Fig. 16. Other sources give slightly different numbers.

Several primary factors might have contributed to the declining loss rates. The

enemy kept adding more antiaircraft weapons, but as the U.S. gained experience

countering them, improved tactics and electronic countermeasure (ECM) equipment

considerably reduced the risk that those weapons would shoot down airplanes. The

increasing number of strike sorties may have saturated enemy defenses, allowing more

planes to escape damage. Lengthening approved target lists may have been another

factor. The small number of permissible targets early in Rolling Thunder had confined

planes to a few targets at a time, but the declining loss rates correlated with increasing

numbers of approved targets. The North had quickly recognized the early target

restrictions and concentrated their defenses around those locations, resulting in "more

pilot and airplane losses" because attacks lacked the element of surprise.[67] The expanding

target lists denied the ability to concentrate defenses in predictable locations.

Aircraft loss rates varied widely throughout enemy territory, and USAF leaders

thought that fact indicated the relative priority the enemy placed on defending different

areas. Analysts were uncertain about the enemy economic and military posture. Since the

North Vietnamese presumably understood their own vulnerabilities, bombing might inflict

more damage by concentrating on the most vigorously defended targets. Losses near

Hanoi and Haiphong were high, partly because the enemy massed defenses there even

though raids were relatively infrequent. Lower loss rates sustained while bombing other

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[66] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 204.
[67] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, pp. 480 and 496.

less heavily defended areas such as the southern panhandle suggested the North regarded

targets in those areas as less important.

Judging bombing effectiveness by loss rates posed dilemmas. Aircrews shot down

obviously added to the mounting casualty lists. Air leaders preferred to avoid flying into

the teeth of enemy defenses, but were willing to use high loss rates as an additional

justification for recommending targets the administration hesitated to sanction. The loss

rate in northeastern North Vietnam was about eight times the average of all other areas,

but PACOM "did not recommend reducing operations to reduce losses."[68] Instead, the

command argued the U.S. should increase enemy costs while decreasing American loss

rates by attacking many more targets in that heavily defended region. The reasoning may

have been that heavier and more frequent attacks would wear down air defenses, leading

to lower loss rates than intermittent raids against well-prepared, intact defenses. Lower

loss rates might not prevent larger total numbers of planes from being shot down, but

commanders seemed willing to pay a higher price to achieve success. When asked in early

1967 if target destruction was worth the losses, PACAF commander General Harris

agreed, "we have had relatively serious loss rates," but said, "I think the targets and their

destruction warrant the losses. It's certainly regrettable that we have suffered losses in

this area, but I think that it's certainly not been in vain. I think that the target destruction

has taken its toll and I think ... I'm a little more optimistic about the outcome."[69] Military

reasoning held that if the U.S. wanted to pressure the North, then planes should bomb

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[68] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 90.
[69] Harris, OHI transcript, Feb. 8, 1967, p. 39.

places the enemy deemed most worth defending. Of course, the enemy may have defended some relatively unimportant areas precisely because the Americans kept attacking those places.

The supposed correlation between defenses and target value led to another dilemma. Attacking heavily defended targets may or may not have been more militarily effective than the alternatives, but would have conflicted with the desire to minimize American casualties. Missions against low value targets might have incurred lower loss rates, but those losses would have seemed in vain if the enemy did not behave as if the targets were important. Justifying targets according to the lethality of enemy defenses was also a tacit admission of uncertainty about the best air strategy and revealed a hope the enemy's defensive priorities would reveal his vulnerabilities. The initiative behind deciding where and when to bomb would thus shift towards the Communists, weakening Adm. Sharp's dictum that Rolling Thunder was the offensive part of American strategy whereby "the enemy is forced to react at places and times of our choosing."[70]

The discussion thus far has treated active air defenses as an aggregate, but military leaders attributed different effectiveness implications to each active air defense weapon category. The Soviet-built SAMs deployed in North Vietnam attracted considerable attention. The missiles were clearly dangerous antiaircraft threats, and their sophistication and cost underscored Vietnamese willingness to use every conceivable defense against bombing in vital areas. The enemy prepared increasing numbers of launching sites, but

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[70] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 7.

only a portion of them was occupied on any given day. Missile equipment was mobile so the U.S. could not be sure in advance which sites were active.

Heavy aircraft losses to SAMs would have been an obvious sign of ineffective bombing, so USAF leaders repeatedly emphasized the missiles' low probability of hitting planes. Missiles claimed a grand total of only 114 planes or about 12% of total Rolling Thunder losses over the North, but that statistic encapsulated additional nuances. A typical metric air commanders used to characterize SAM effectiveness was not merely the raw number of planes shot down, but the ratio of SAMs fired to planes destroyed. For the Americans, the more SAMs required to kill one plane, the better. The North launched 194 missiles to shoot down 10 planes in 1965, 1096 to down 30 planes in 1966, 3495 to down 63 planes in 1967, and 646 to down 11 planes through October 1968. The ratios of SAMs fired to planes killed for those years were therefore 19.4, 36.5, 55.5, and 58.7 respectively, suggesting missiles became progressively less lethal each year.[71] Declining loss rates and increasing missile-to-kill rates obscured the less sanguine fact that aircraft losses due to SAMs tripled from 1965 to 1966 and then doubled from 1966 to 1967.

The improving missile-to-kill ratios may have helped air leaders counteract worries regarding the increasing absolute numbers of planes shot down, but the administration used the statistics for other purposes. According to Maj. Gen. Ginsburgh, Secretary McNamara used exactly those ratios to justify his recommendations that the President not authorize attacks against SAM sites except under carefully limited circumstances.

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[71] Data through Sep. '68 are from Rolling Thunder Digest, Oct. – Dec. 1967, p. 49 and from p. 6 of each 1968 edition. Oct. 1968 data are from CHECO Report, "Rolling Thunder, Jan. 1967 – Nov. 1968," Fig.

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Ginsburgh summarized McNamara's view by saying, "they're [SAMs] not really giving us all that much trouble; so why waste our effort on attacking SAMs which are difficult to attack because of their mobile capability and are not really all that effective against us?"[72]

Publicly downplaying the SAM threat may have backfired in a second way. The Soviets had first supplied the Vietnamese with outdated SA-2 missiles, but later began sending improved versions. A PACAF report said, "The JCS believed we had been indiscreet in making public the numbers of SA-2 missiles launched versus aircraft downed by NVN and our cleverness in devising effective countermeasures. They believed this would result in greater hazards to our aircrews and increase our aircraft losses to SAMs. It was believed it might goad the Soviets into providing Hanoi with more advanced equipment."[73] Publicizing low loss rates in the face of advanced defenses had the paradoxical effect of making bombing seem more effective in the short term while evidently provoking an enemy backlash that could eventually undermine that effectiveness in the long term. Since the administration had settled upon a prolonged war of attrition, the long term was the time frame that counted the most. Despite improving ratios of missiles fired to planes lost, total annual aircraft losses to SAMs multiplied over six fold from 1965 to 1967, yet air planners clearly wanted to counteract the impression SAMs were therefore becoming increasingly lethal. Either downplaying or dramatizing the missile menace might lead to troubling consequences for American commanders.

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[72] Ginsburgh, OHI transcript, p. 51.
[73] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 113.

The MiG fighter jets were even less deadly than SAMs, claiming annual aircraft

totals of 2 in 1965, 9 in 1966, 25 in 1967, and 12 in 1968.[74] The 48 American planes

MiGs shot down represented only about 5% of total American losses over North Vietnam,

but those losses were highly prominent. Air commanders understood how the dramatic

political implications of aerial victories outweighed the material importance of the planes

shot down. Even the least knowledgeable observer could measure success by comparing

numbers of planes each side destroyed in air-to-air battles. If Vietnamese pilots shot down

many American planes, the psychological triumph might discredit American air power.

The thought of pilots from a backward Third World country defeating American pilots in

aerial combat was simply galling to U.S. airmen, but air commanders emphasized a less

direct way to measure the MiG's impact on the campaign. Officially, PACOM discounted

the importance of the few planes lost to fighters, emphasizing instead the MiGs ability to

divert American air assets. One report noted, "Aircraft losses to MiG's do not fully

measure the threat … It can be seen that while the effectiveness of the NVN MiG's is

relatively low when considering their success in air-to-air engagements, they do divert

attacks from intended targets and cause the commitment of extensive forces to constantly

protect against the threat which they pose."[75]

Decisions about how to measure the MiG threat spilled over into American policy

makers' attempts to choose the most effective way to counter the enemy jets. Many

USAF members may have intuitively liked the idea of heroic air aces shooting down MiGs

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[74] Data through Sep. 1968 are from Rolling Thunder Digest. Oct. 1968 data are from CHECO Report, "Rolling Thunder, January 1967 – November 1968," Fig. 16.

in swirling dogfights, but senior commanders often adopted a more pragmatic view. After

his retirement, Gen. Meyers said, "the number of airplanes we shot down, if we'd shot

down any, wouldn't have made any great difference one way or another in what the hell

happened. So it really didn't have any major role to play."[76] Commanders knew from

experience that bombing airfields was a more efficient way to counteract enemy fighter

planes than engaging them in air-to-air combat, but the Johnson Administration was

exceedingly hesitant to authorize attacks against key Hanoi-Haiphong area airfields.

The chronic dispute over whether or not to bomb the Phuc Yen airfield near Hanoi

illustrated the contrasting administration and military MiG threat perceptions. For more

than two years, American pilots endured heavy AAA coming from the airfield and could

literally watch MiGs taking off to intercept them, but could not attack the field.[77] Serious

aircrew morale problems resulted. Seventh AF Commander Gen. William Momyer had

dismissed MiGs as "no longer a threat"[78] by August 1967, but the military repeatedly

recommended striking Phuc Yen. Strike approval finally came in October 1967 when the

President overrode McNamara's continuing objections.

When asked in August 1967 why he had repeatedly recommended that the

President disapprove Phuc Yen, McNamara used an argument very similar to the one

General Ginsburgh attributed to him when the Secretary resisted calls to bomb SAM sites.

[75] Rolling Thunder Digest, Oct. – Dec. 1966, p. 25.
[76] Gen. Gilbert Meyers, OHI transcript, May 27, 1970, K239.0512-282, in USAF Collection, AFHRA, p. 150.
[77] Lt. Col. William S. Van Gilder, OHI transcript, Jun. 20, 1968, K239.0512-065, in USAF Collection, AFHRA, p. 23. Gia Lam airport near Hanoi was another example, but unlike Phuc Yen, President Johnson never authorized attacks against Gia Lam.

McNamara explained that attacking that air base was "entirely a question ... of whether we can achieve lower losses to our pilots by attacking than by not attacking the airfield."[79] He emphasized that MiGs claimed few U.S. planes, but some American planes would probably be lost attacking the heavily defended airfield. No attack could destroy all the MiGs at the field, and the enemy could repair most damage in a matter of days so repeated attacks would be necessary, entailing continuing U.S. losses. The Secretary thus emphasized the direct aircraft losses to be expected from alternative strategies. His explanation was an example of judging effectiveness by rational cost-benefit criteria appropriate for business decisions as well as the hypothetical number of American lives saved, but was difficult to reconcile with his willingness to dispatch numerous armed reconnaissance sorties to search for elusive targets dispersed throughout defended transportation networks.

Other reasons the administration gave for disapproving airfield attacks emphasized strategic concerns that the Soviets might replace destroyed MiGs - perhaps with improved models - and that China might host Vietnamese air bases on Chinese territory much as they had welcomed North Korean aircraft during the Korean War.[80] Newer MiGs would have added to the other specter of newer SAMs and Chinese air bases would have resurrected the Korean War dilemma of whether or not to attack Vietnamese air bases in China. Those worries were consistent with the lingering Johnson Administration fear of Chinese or Soviet intervention if excessive pressure were applied to North Vietnam.

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[78] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, pp. 168.
[79] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 303.

Aircrews presumably would have preferred not to face enemy planes of more advanced types, but Chapter 3 described how crews might even have welcomed the prospect of driving the MiGs away to Chinese fields. Pacific Command and other organizations were confident that most of North Vietnam's MiGs did indeed move to Chinese bases when the President authorized heavier airfield attacks in late 1967, but continued air-to-air duels did not lead to the feared confrontation with China.[81] Nobody seriously advocated striking Chinese air bases used by Vietnamese MiGs.

Like the Secretary of Defense, Gen. Meyers and other military figures analyzed the danger posed by the Phuc Yen airfield according to the relative costs and benefits to be expected from either attacking the field or leaving it alone, but reached the opposite conclusion because they weighed the indirect costs imposed by MiGs more heavily than McNamara. Meyers realized the few enemy planes present seldom flew, but still told the Stennis Committee in 1967 that if the Phuc Yen airfield were bombed, "More effective utilization would result from the air resources that are available." The mere threat the MiGs posed forced each U.S. strike mission to include fighter escorts to defend against possible interception. Escorting each mission diverted U.S. planes from bombing to defensive roles and exposed more crews to possible loss. Meyers told the Stennis Committee that the thousands of extra sorties flown to defend against infrequent MiG attacks were "another illustration of how our air resources were not being most effectively utilized to carry the war to the enemy." General Meyers was the same officer who, only

[80] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 120.
[81] See Rolling Thunder Digest, Apr. – Jun. 1967, p. 29.

moments later, admitted sending more strike sorties against targets than was "militarily advisable ... so we would not lose sorties in the next allocation," so his commitment to exposing fewer crews to hostile fire was limited.[82] However, practically every senior Air Force officer would have agreed that allowing airfields to be sanctuaries and waiting for the MiGs to attack first conflicted with Rolling Thunder's ostensibly offensive nature, wasted American effort, and voluntarily surrendered the initiative to the enemy.

Rolling Thunder commanders understood perfectly well that the North Vietnamese could repair visible damage inflicted on airfields such as Phuc Yen, but thought the most important and long lasting benefits of airfield attacks did not show up well in aerial photos. Pacific Command deemed the airfield attacks that took place in late 1967 worthwhile because, "Although crater repair activities returned the runways of the main jet airfields to serviceability, a large part of NVN's aircraft facilities remains destroyed. Vital ground support equipment, including refueling vehicles, starter units, and oxygen and weapons system handling equipment, is believed to have been severely damaged or destroyed."[83] Flattened hangars and cratered runways showed up much better on photographs than the more important damage to ground support equipment, but even the most dramatic looking airfield damage seemed less imposing than damage to other structures such as bridges. The enemy quickly repaired runways – often within two days - making airfields at least look serviceable. In contrast, destroyed bridges were dramatically apparent in photos and repairs usually took time. Air commanders understood the need to

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[82] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, pp. 490, 485, and 486.
[83] Rolling Thunder Digest, Oct. – Dec. 1967, p. 16.

attack airfields persistently in order to suppress MiGs, but other observers might have felt

rapid runway repairs rendered airfield strikes rather futile because the visually impressive

runway damage had such a short duration. Using indirect ways of measuring airfield

attack results was sometimes a handicap because damage to airfield support equipment

was harder to prove than simpler and more obvious results like runway cratering.

Airfields also seemed to encapsulate conflicting interpretations of damage repair

speeds. Rapid repairs suggested the North Vietnamese valued their airfields so the

airfields were worthwhile targets. However, the relative speed and ease of repairing most

visible damage made the attacks seem unprofitable – especially if aircraft were shot down

while bombing the fields. Unfortunately, damage to aircraft ground support equipment

took a long time to fix, but was not photographically significant.

Although less technically sophisticated than SAMs and less glamorous than MiGs,

the deadliest and most widespread North Vietnamese air defense weapon was AAA.

Available in various calibers, guns were often highly mobile and easily concealed. The

Vietnamese prepared tens of thousands of AAA sites, only a fraction of which were

occupied at any one time. Guns and crews moved constantly in a deadly shell game with

U.S. air units. Although single guns were not very dangerous (except perhaps for the

largest caliber types), heavy concentrations, when supplied with adequate ammunition,

threw up veritable curtains of projectiles and shot down more planes than SAMs and

MiGs combined. Annual totals of planes lost to AAA were 75 in 1965, 160 in 1966, 158

in 1967, and 88 through October 1968 for a grand total of 481.[84] Therefore, AAA

claimed almost 52% of the aircraft lost over the North during Rolling Thunder. Air

commanders and administration officials unanimously acknowledged AAA was the most

widespread and dangerous form of active air defense. The predominant role AAA played

in shooting down aircraft submerged most disputes about how the guns themselves

influenced bombing effectiveness in the larger question of how air defenses in general

shaped the campaign's results.

One final source of aircraft losses requires a few brief comments. Statistics

apportioning losses among SAMs, MiGs, and AAA excluded planes lost to unknown

causes. Aircraft lost for mysterious reasons numbered 82 in 1965, 84 in 1966, 87 in 1967,

and 33 through October 1968 for a grand total of 286.[85] The category accounted for

almost 31% of total aircraft losses (more than SAMs and MiGs combined) and was

second only to AAA losses. Doubtless, air defenses destroyed some of those planes, but

others succumbed to mishaps such as crashing into mountains. Despite the large number

of aircraft lost to unknown causes, senior officials rarely alluded to the subject.

Expected loss rates due to the cumulative lethality of active air defense weaponry

influenced administration choices about whether to approve targets, but could produce

some surprising decisions. As enemy antiaircraft defenses - especially AAA - proliferated,

many targets that were weakly defended in 1965 were much more heavily defended by

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[84] Data through Sep. 1968 are from Rolling Thunder Digest. Oct. 1968 data are from CHECO Report, "Rolling Thunder, January 1967 – November 1968," Fig. 16.
[85] Data through Sep. 1968 are from Rolling Thunder Digest. Oct. 1968 data are from CHECO Report, "Rolling Thunder, January 1967 – November 1968," Fig. 16.

1967. Common sense might suggest bombing would have been safer in 1965 than in later years, but reality was more complex. The proliferating defenses appeared to be an obvious sign of increasing risk to aircraft, but U.S. leaders reached opposing conclusions about the threat.

Secretary McNamara agreed enemy antiaircraft weapons were becoming increasingly numerous, but contended the danger they posed to U.S. planes was actually decreasing. When the Stennis Committee asked him in August 1967 why he had not allowed attacks against some targets earlier in the war when defenses were lighter, McNamara replied, "the risk of loss of pilots in relation to the value of the targets has changed. The risk of loss of pilots has decreased as our effectiveness in air operations has increased, and it has made it more desirable to hit certain targets today than it was several months ago."[86] The Secretary credited improved tactics and electronic countermeasures with permitting lower loss rates against heavily defended targets in 1967 than if the same targets had been attacked earlier when they were less heavily defended. Statistics seemed to be on the Secretary's side. Air Force Chief of Staff Gen. McConnell himself had cited a dramatic loss rate decrease from 3.2 to 1.6 per thousand sorties of all types between 1965 and 1967.[87] The ever-increasing numbers of SAMs fired to shoot down one aircraft also suggested air defenses were becoming progressively less lethal.

Nevertheless, General Meyers disputed Secretary McNamara's assertion that more heavily defended targets could be attacked with lower loss rates in 1967 than in 1965.

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[86] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 292.
[87] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 204.

Testifying before the Stennis Committee four days after McNamara, Meyers agreed

improved American ECM gear afforded considerable protection against radar-guided

SAMs and AAA, but he said that enemy AAA often used optical sights that obviated use

of fire control radars susceptible to jamming by ECM equipment. Furthermore, he pointed

out that planes evading SAMs by descending to lower altitudes where SAM guidance

radars were degraded by ground clutter found themselves at heights where AAA defenses

were denser and more effective.[88] Unlike McNamara, Meyers did not use statistics to

support his contentions at that time.

Military officials sometimes asserted that commonly used statistics distorted the

ways air defenses related to bombing effectiveness. One of their complaints was that

declining aircraft loss rates were a misleading effectiveness indicator because increasing

sortie rates disguised the fact that larger absolute numbers of planes were being lost even

as the loss rate declined. Administration restrictions on allowable sortie rates early in the

campaign may have further distorted the loss rate trend. As General Meyers explained, "If

you've got few sorties and you know that you want to get that target, you start using low-

level tactics, and things of this nature where your probability of hits goes up, and your loss

rates go up too. So it forces you to do a lot of things that you wouldn't do normally."[89]

As the administration eased sortie limitations, the problem Meyers described may have

subsided. Commanders also thought losses would have been even lower if the U.S. had

not permitted the North Vietnamese the luxury of assembling an increasingly advanced

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[88] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, pp. 482-483.
[89] Meyers, OHI transcript, p. 182.

antiaircraft system. The improving coordination between SAMs, MiGs, and AAA seemed

even more ominous than the raw increases in weapon numbers, but planners were

confident they could have defeated the enemy defenses if given permission. Colonel

Edelen thought, "I do think that, if we could have effectively taken care of the MiGs

earlier, we could have handled the remainder of the air defense problem, the SAMs and

AAAs, and done a more effective job."[90] Edelen was describing air defense as an

integrated target system on a par with transportation or POL rather than an agglomeration

of individual air defense facilities.

Military leaders found themselves in a predicament when they used aircraft loss

rates to judge bombing effectiveness. They sometimes cited declining loss rates to show

increasing air power effectiveness, but then had to argue against their own statistics to

suggest the loss rates also concealed unfavorable trends. The argument was analogous to

the belief that aerial interdiction was indeed effective overall, but would have been much

more effective if the military were allowed to run the air war with fewer political fetters.

The generals were seemingly trapped between their own claims of effectiveness and their

countervailing complaints about how political constraints sabotaged that effectiveness.

The stark disparity between administration and military interpretations of loss rate

data raises the question of whether the loss estimates guided strategy or strategy guided

the loss estimates. The earlier examination of how American officials interpreted bomb

damage repair trends posed the question of whether repair efforts were an input to the

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[90] Edelen, OHI transcript, pp. 95-96.

bombing assessment process or a polemical device used to justify preexisting opinions. The same question applies to loss rate interpretation. Ideally, policy makers should have considered loss rates when they made bombing policy choices, but loss rate figures might really have been little more than handy rhetorical tools pressed into service to justify opposing strategies. The administration's graduated pressure policy had entailed less bombing while defenses were weak and more when they were strong, so McNamara said loss rate data supported that policy. Conversely, the military chiefs had wanted intense bombing from the outset, and their portrayal of easy bombing in the face of weak defenses early in the war supported their favored policy. An Air Staff planner deemed loss rates militarily acceptable and dismissed political controversy surrounding the rates as "just the various reasons that were advanced by those who were opposed to any expansion of the bombing campaign because such reasons seemed to hold some weight."[91] Unfortunately for the military, declining loss rates appeared to mean fewer casualties, but supported the Administration's position. The true impact of aircraft loss rate figures on effectiveness was obscured by the polemics.

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[91] Edelen, OHI transcript, pp. 55-56.

CHAPTER 8 – HEADQUARTERS ASSESSMENT: THIRD ORDER CRITERIA

All the effects analyzed thus far were subsidiary to bombing's desired third order effect, which was to persuade the Hanoi government to end the war on terms acceptable to the U.S. Of course, separating Rolling Thunder's contribution to any political change from that of other air or ground combat would be problematic. Since bombing was supposed to dissuade the North Vietnamese from pursuing a policy harmful to American interests, deterrence emerged as a possible effectiveness indicator. Friendly and enemy morale, signs of willingness to negotiate, and the tone of enemy propaganda were other interrelated criteria U.S. leaders studied for signs of bombing's third order results.

Deterrence theory predicated third order effectiveness not upon bomb damage inflicted, but upon the threat of damage to come. Although commonly associated with nuclear strategy and Cold War relations where each side possessed the means to destroy the other, deterrence theory occasionally cropped up in Rolling Thunder - especially during the first year or so. North Vietnam itself was obviously not a military superpower, but the Americans perceived the Hanoi regime as an appendage of the much more powerful Soviet Union and China. An Air Staff officer traced the idea that key North Vietnamese facilities were objects the U.S. could ransom to coerce Hanoi into accepting American peace terms back to an April 1965 conference of top American civilian and

military leaders.[1] That month, Secretary McNamara made the remark, "it is important not

to 'kill the hostage' by destroying the North Vietnamese assets inside the 'Hanoi do-

nut.'"[2] McNamara's mid-1965 Rolling Thunder review said, "'pressure' on the DRV

depends not upon the <u>current</u> level of bombing but rather upon the credible threat of

<u>future</u> destruction."[3] In other words, bombing's ultimate utility might not depend on the

amount of physical damage inflicted as long as the enemy feared his vital facilities might be

destroyed in the future. The idea, which officials often called the "hostage theory" or the

"captive theory," corresponded nicely with the administration's graduated bombing policy.

Deterrence theory lost credibility as the bombing continued. By late 1966, a

RAND Corporation study found reasons to doubt the validity of deterring Hanoi with the

threat of heavier bombing. The study said that as soon as the bombing had started in

1965, North Vietnamese statements began depicting it "as the prelude to inevitable

escalation to massive attacks on economic and population targets."[4] The study argued

that if the Vietnamese were convinced from the outset that heavier bombing was

unavoidable and were prepared to face that likelihood, then American efforts to deter

them by threatening escalation were pointless. Any escalation would simultaneously

[1] Col. Henry H. Edelen, Jr., OHI transcript, Jan. 27, 1970, K239.0512-243, in USAF Collection, AFHRA, pp. 59-60.
[2] Memo, McNamara to the President, April 21, 1965, U.S. Department of Defense, <u>United States - GVN Relations</u>, (Washington, D.C.: Gov't Printing Office, 1972), IV.C.3, p. 100. (Cited hereafter as "Pentagon Papers.") The term "do-nut" referred to the shape made by two concentric circles around Hanoi. The smaller circle was a prohibited zone, the larger a restricted zone.
[3] Sec. McNamara's Rolling Thunder review, July 30, 1965, Pentagon Papers, IV.C.3, p. 139. Cited again in IV.C.7.(a), Volume I, p.15.
[4] Oleg Hoeffding, <u>Bombing North Vietnam: An Appraisal of Economic and Political Effects</u>, RAND Corporation Memorandum RM-5213-1-ISA, Dec. 1966, p. 1.

bolster Hanoi's reputation for prescience at predicting the war's future course and discredit American claims of exercising restraint and controlling the war's progress.

Threatened escalation was implicit in both deterrence and graduated bombing, but the RAND analysts detected a logical contradiction between escalation and the limited American war aims. Self-imposed bombing constraints emphasized reducing civilian casualties and attacking only military targets, but those constraints were "subjective and stretchable." The RAND report noted, "Presumably, ... effectiveness will be the greater the more the constraints are stretched. In any event, there would be constant temptation to stretch them if initial and relatively rigorous definitions did not yield the desired results."[5] However, relaxing restraints to achieve greater effectiveness would contradict U.S. claims of limited political goals to be achieved by limited means. The study concluded that even escalated bombing would probably not deter Hanoi from continuing the war as long as the U.S. permitted unlimited imports through Haiphong harbor. Thus, deterrence seemed difficult to reconcile with American war aims and air strategy.

Civilian officials apparently considered deterrence a legitimate strategic concept during at least the early part of the campaign, but military commanders seemed either unfamiliar with the concept's Rolling Thunder application or to doubt its applicability. In 1971, an interviewer asked former PACAF commander General Ryan, "Could you comment, sir, on what is known as the 'hostage theory' or the 'captive theory?'" Ryan replied, "I don't know what that is." When asked a similar question during a 1970

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[5] Hoeffding, p. 23.

interview, retired Air Force Chief of Staff Gen. McConnell replied, "What is the hostage theory?"[6] Major General Ginsburgh was familiar with both terms, but flatly disagreed with their applicability to the war.[7] Commanders did not deem deterrence a meaningful indicator of bombing's influence on enemy behavior. General McConnell advocated bombing all military targets and possibly giving advance warning to evacuate populated areas adjacent to planned targets.[8]

Air commanders were, however, willing to use deterrence jargon as an expedient alternative justification for bombing when arguing for their preferred bombing program. According to a PACAF report prepared while Ryan's was commander, General Westmoreland saw April 1966 VC attacks against some South Vietnamese cement and textile plants as "proof of the Viet Cong determination to disrupt the local [South Vietnamese] economy and to hamper industrial development." He recommended retaliatory strikes against a North Vietnamese steel plant "as a deterrent to further destruction of SVN [South Vietnamese] industry by the Viet Cong."[9] Although the validity of deterring the VC by punishing North Vietnam at that time was unclear, the PACAF report said Adm. Sharp concurred with Westmoreland's basic idea, but recommended attacks against the POL system instead of the steel plant. Sharp was troubled, however, that Westmoreland's recommendation amounted to launching attacks

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[6] Gen. John P. McConnell, OHI transcript, Nov. 4, 1970, K239.0512-371, in USAF Collection, AFHRA, p. 4.
[7] Maj. Gen. Robert N. Ginsburgh, OHI transcript, May 26, 1971, K239.0512-477, in USAF Collection, AFHRA, p. 47.
[8] McConnell, OHI transcript, Nov. 4, 1970, p. 4
[9] Headquarters PACOM, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, July 1965

against industrial facilities in retaliation against enemy provocations, possibly because

adopting such a policy would concede initiative to the enemy in what Sharp consistently

characterized as an air offensive wherein the Americans held the initiative and decided

where and when to bomb. The PACAF report said that neither Sharp nor other senior

leaders wanted "to place targets in a reserve category for retaliatory purposes"[10] or to

deter the enemy. They had been trying instead to attack industry - especially POL - at that

time in early 1966, regardless of VC actions. The admiral adopted and modified

Westmoreland's idea of deterring future VC raids, converting it into another lever to gain

support for his expanded bombing plan, which soon reached fruition in the extensive, but

ultimately disappointing, mid-1966 POL campaign.

Military leaders sometimes portrayed deterrence as a concept applicable to

countries not even participating in the war. Admiral Sharp noted in 1966 that air strikes

near the minor seaport of Cam Pha "had had a most salutary effect" of diverting third

country shipping away from the port. He thought similar strikes near Haiphong "would be

most effective in deterring future visits by foreign ships."[11] Perhaps the view was sincere,

but ships had already been visiting harbors in the war zone for over a year. The admiral's

real wish was to bomb and mine Haiphong. If some variant of deterrence theory had

persuaded the administration to authorize the attacks, then CINCPAC would have been

content. Sharp stretched deterrence ideas even further when he argued that reducing

bombing would "cause our allies to consider us irresolute in our determination to force

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- December 1966," p. 52. (Cited hereafter as "CHECO Report" followed by title.)
[10] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 54.

Hanoi to stop its aggression. Thus, the Communists would be encouraged to increase their disruptive efforts throughout Southeast Asia."[12] The conceptual dividing line between impressing allies and intimidating enemies was thin.

Senior American officials persistently tried to assess what might be termed the morale balance between friendly and enemy forces. Morale resists precise definition, but military officers might describe it as a psychological attitude characterized by an enthusiasm that brings a willingness to endure suffering and exert effort to achieve victory. Morale in the Rolling Thunder context was a prevailing mood one sensed intuitively by observing people's outward behavior, but nobody could explain how to measure it. Bombing's reputed ability to improve friendly forces' morale while weakening that of the enemy has been a standard effectiveness indicator since aerial warfare's earliest days. Early air power theorists such as Giulio Douhet had advocated terror bombing to break the morale of civilian populations, but the resilience of British, German, and Japanese civilians under intense World War II bombing had discredited that notion. No Rolling Thunder officials advocated terror bombing North Vietnamese civilians, but they all envisioned important psychological justifications for the bombing. Military and administration thinking about bombing's morale effects differed, but there were some points of agreement. To describe morale effects, commanders articulated a three-way relationship between American forces, the South Vietnamese, and the enemy.

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[11] CHECO Report, "Rolling Thunder, July 1965 - December 1966," pp. 49 and 54.
[12] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 89.

The generals perceived an asymmetrical relationship between bombing and

American morale. Commanders rarely justified Rolling Thunder by claiming the bombing

raised the morale of U.S. forces. They usually claimed American morale was good

enough already, but perhaps they simply did not believe bombing was capable of boosting

flagging American morale. Increased bombing might not raise American morale

significantly, but the generals were sure that decreased bombing lowered it. Commanders

from all American military services talked about the morale of their servicemen. During

July 1967, Seventh AF commander Gen.l Momyer wrote a personal letter to USAF Chief

of Staff Gen. McConnell in which he claimed, "Morale has never been higher."[13] The next

month, Momyer told the Stennis Committee that USAF "Morale is tremendous."[14] Army

General Harold Johnson agreed American morale was good in 1967, but worried that a

bombing halt would have a "major impact" on the morale of U.S. Army troops.[15] Marine

Corps General Greene considered a bombing halt "the worst mistake we could possibly

make" because "the Marines would certainly feel they have been let down, that the action

was entirely wrong … this impact on the attitudes of our fighting men, if the bombing

were to be stopped, is the most serious part of the problem."[16]

The U.S. military said less about how bombing affected South Vietnamese military

morale, but the Air Force initially expected allied forces to respond much like American

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[13] Gen. William Momyer, letter to Gen. John McConnell, Jul. 22, 1967, Gen. McConnell Correspondence, 168.7102-7, in USAF Collection, AFHRA.

[14] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 2, Aug. 16, 1967, p. 169. (Cited hereafter as "Senate Preparedness Subcommittee.")

[15] Senate Preparedness Subcommittee, Part 5, Aug. 25, 1967, p. 388.

forces. A 1965 PACAF report noted, "the commencement of air strikes against targets in North Vietnam on a regular basis for the first time overshadowed the rest of the U.S. effort, resulting in a noticeable improvement of morale in both the U.S. and Vietnamese forces."[17] American interest in southern morale seemed to wane, however. Air Staff planner Col. Henry Edelen noted that early JCS papers discussed raising South Vietnamese morale, but those comments decreased as the campaign progressed. He proposed three possible explanations for the declining JCS references to raising allied morale. The first possibility was the JCS may have thought merely starting the bombing campaign would be enough to raise southern morale. A second was that the JCS did not deem raising morale a significant objective. Thirdly, the declining amount of attention "might have been because you can't measure your success in improving morale."[18]

Commanders expressed perennial uncertainty about bombing's effects on enemy morale. Bombing's apparently modest impact on enemy morale by the end of 1965 prompted one Air Force study to conclude, "Indications pointed to a prolonged struggle, since Hanoi's attitude did not change as a result of ROLLING THUNDER nor was the NVN morale significantly [sic] shaken to produce a change."[19] The outlook seemed somewhat better by 1967, but a PACOM report still offered the mixed conclusion that "the bombings are taking an increasing toll and causing pressures and strains ... While there are few open signs, the cumulative effects of the growing hardships and shortages

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[16] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 461-462.
[17] CHECO Report, "Rolling Thunder," (through mid-1965), p. 2.
[18] Edelen, OHI transcript, p. 113.
[19] CHECO Report, "Rolling Thunder, July 1965 - December 1966," pp. 20-21. ("Significantly" should

are wearing down the resistance of the people. ... However, the leadership in Hanoi

maintains an official position of intransigence."[20] Commanders suspected enemy morale

was wavering, but they were not certain enough to make outright claims that bombing

could break it.

The doubts prompted military officials to envision a different asymmetrical

relationship between bombing and enemy morale than the one they postulated between

bombing and friendly morale. Increased bombing might not lower enemy morale

significantly, but reduced bombing could raise it appreciably. General Wheeler

disapproved of flying fewer bombing sorties because "any changes except an increase is

going to be interpreted by the North Vietnamese as weakening, as wavering, as lack of

determination" that would "strengthen their determination to hang on rather than the

contrary."[21] Even if enemy morale were relatively insensitive to bombing, PACOM still

recommended heavier attacks and closing Haiphong because, "The will to resist would

amount to very little if the means to resist were taken away."[22] After bombing ended

above 19° North in April 1968, PACOM noted, "Several reports from reliable sources

indicate that as a result of the bombing cessation a feeling of high morale is evident in

North Vietnam. ... Few people were noted expressing war weariness or longing for peace;

on the contrary, the general feeling is one of confidence in a complete victory."[23]

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probably have been "sufficiently")
[20] Headquarters PACOM, Operations Division, Rolling Thunder Digest, Jan. – Mar. 1967, p. 9.
[21] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, pp. 149-150.
[22] Rolling Thunder Digest, Oct. – Dec. 1966, p. 28.
[23] Rolling Thunder Digest, Apr. - Jun. 1968, p. 7.

Belief in the ease with which bombing reductions could lower American and South

Vietnamese forces' morale while raising enemy morale led commanders to postulate an

inverse relationship between friendly and enemy morale. When summarizing Rolling

Thunder's capacity to reduce enemy ability and will to fight while raising South

Vietnamese morale, Col. Edelen said, "I think bombing definitely did that."[24] Admiral

Sharp thought that if bombing stopped, "first of all, it would be a great boost for the

morale of the North Vietnamese; ... The morale of the allied forces would be bound to be

very seriously affected."[25] Therefore, upholding U.S. morale and keeping enemy morale

from improving both demanded bombing to continue, but not necessarily to increase.

Since commanders seldom claimed bombing could break enemy morale, bombing

missions overtly intended to lower enemy morale were uncommon, but such justifications

occasionally appeared as additional reasons to attack some targets. Morale and deterrence

rationales could also commingle. In 1965, "PACAF believed that judicious selection of a

few industrial targets outside the Hanoi/Haiphong complex (such as the Viet Tri Chemical

Plant and the Thai Nguyen steel facility), for token attacks, would have beneficial and

punitive effects. Intelligence reports from neutral sources in Hanoi indicated the North

Vietnamese feared such attacks."[26] The Air Force had wanted to bomb those industrial

targets from the outset. Using potential morale or deterrence justifications may have

reflected a willingness to use any method of obtaining target approvals when conventional

military justifications proved unpersuasive to the administration.

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[24] Edelen, OHI transcript, p. 113.
[25] Senate Preparedness Subcommittee, Part 1, Aug. 10, 1967, p. 90.

A clearer example of using morale justifications for bombing was the 1966 decision to strike the mostly vacant Dien Bien Phu airfield in far western North Vietnam. Unable to attack important MiG airfields such as Phuc Yen or Kep at that time, American planes pounded the remote site of the famous 1954 battle between French and Vietnamese forces that had prompted the French to withdraw from Southeast Asia. Air Force damage reports included the customary information about numbers of buildings damaged or destroyed and the extent of runway cratering, but also noted, "In addition to the physical damage inflicted ... the strike had important psychological overtones. Dien Bien Phu had become a symbol of the collapse of French power in 1954 and was held in high esteem by North Vietnam. The February attacks showed its vulnerability to U.S. airpower and may well have served as a reminder to Hanoi that they were facing a different and formidable opponent."[27] The report's vague, unprovable psychological assertions contrasted with its concrete physical damage details in a way that suggested lowering enemy morale was a consolation prize rather than an effect the Air Force had really sought to achieve. Morale claims may have been a refuge when more substantive results were not evident.

Some targets may have held special psychological significance, but military leaders usually regarded sortie counts as the predominant morale determinant and most obvious index of American resolve. Only aircrews had the satisfaction of seeing bombs fall on North Vietnam, so other servicemen and the South Vietnamese knew only that planes were either flying over the North or staying at their bases. The characteristics of the

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[26] CHECO Report, "Rolling Thunder, July 1965 – December 1966," p. 8.
[27] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 36.

targets themselves seemed of secondary importance in morale calculations as long as U.S. planes were bombing something militarily significant. When offered the hypothetical option of flying fewer sorties, but against more lucrative targets, General Wheeler favored more sorties against already approved targets.[28] Chapter 5 showed that commanders did not normally judge first or second order success by counting sorties, but they seem to have accorded sortie rates a heavier weight in their morale calculations.

Not all sorties were equal, however. The political prestige associated with strategic bombers made commanders fear the psychological costs of losing them in battle. Morale considerations induced air commanders to de-emphasize sorties flown by B-52s since they feared "that Hanoi might be willing to make a special effort to bring down a B-52 because the feat would obviously boost morale in North Vietnam."[29] Seventh AF target planner Lt Col. Greenhalgh also thought the psychological cost of losing a B-52 was too high to risk "giving the Soviets and the other Communist nations a psychological plum."[30] Interestingly, Gen. Momyer used nearly identical terminology when he said, "the downing of a B-52 would have been a psychological plum for the propaganda machine of the North Vietnamese."[31] Overall, when morale was an issue, the senior officers could partially adopt the administration's view that bombing was more of a political signaling tool than a way to inflict material damage.

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[28] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 149.
[29] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 105.
[30] Lt. Col. William H. Greenhalgh, OHI transcript, Oct. 11, 1967, K239.0512-40, in USAF Collection, AFHRA, p. 37.
[31] Gen. William W. Momyer, Air Power in Three Wars, (Washington, D.C.: Department of the Air Force, 1978), p. 284.

Johnson Administration officials held changing views about morale. They began

the campaign hoping to raise South Vietnamese morale and they had expected bombing to

produce a symmetric inverse relationship between South Vietnamese and North

Vietnamese morale whereby bombing would raise southern morale and bolster the

unstable South Vietnamese government, while lowering Viet Cong morale and hopes of

eventual victory. As Rolling Thunder began, National Security Advisor McGeorge Bundy

said, "The immediate and critical targets are in the South - - in the minds of the South

Vietnamese and in the minds of the Viet Cong cadres." He thought bombing would

produce a favorable reaction among influential southerners and that the "Vietnamese

increase in hope could well increase the readiness of Vietnamese factions themselves to

join together in forming a more effective government." Meanwhile, "effective and

sustained reprisals, even in a low key, would have a substantial depressing effect upon the

morale of Viet Cong cadres in South Vietnam."[32] Bombing the North would therefore

simultaneously rally the South and discourage the enemy. Ideally, a shifting morale

balance would lead to negotiations and a peaceful settlement.

In parallel with their fading faith in deterrence, administration officials' morale

expectations became increasingly restrained as Rolling Thunder progressed. Secretary

McNamara expressed some early expectations that bombing - in conjunction with fighting

in the South - could help "to break the will of the DRV/VC [Democratic Republic of

Vietnam / Viet Cong] by denying them victory," but those hopes faded.[33] McNamara later

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[32] Memo, M. Bundy to the President, Feb 7, 1965, Pentagon Papers, IV.C.3, pp. 37-38.
[33] Memo, McNamara to the President, Apr. 21, 1965, Pentagon Papers, IV.C.3, p. 100.

said he had concluded by May 1967 that enemy morale was unlikely to break.[34] One

factor he said had persuaded him was a CIA memo that said, "Morale in the DRV among

rank and file populace, defined in terms of discipline, confidence, and willingness to

endure hardship, appears to have undergone only a small decline since the bombing of

North Vietnam began."[35] The Secretary remained somewhat more sanguine about

bombing's effect on southern morale. When he told the Stennis Committee why he

thought Rolling Thunder was successful, the first reason he gave was "There can be no

question that the bombing raised and sustained the morale of the South Vietnamese."[36]

McNamara had added raising South Vietnamese morale to Adm. Sharp's list of

Rolling Thunder tasks, but he began to perceive adverse side effects of using bombing to

bolster morale. Once the bombing became routine, McNamara conceded southern morale

had receded to pre-bombing levels and that "South Vietnam is now 'addicted' to the

program; a permanent abandonment of the program would have a distinct depressing

effect on morale in South Vietnam."[37] McGeorge Bundy also felt prompt action to exploit

any advantageous morale trends in the South would be important because, "like other

stimulants, the value of this one [bombing] would decline over time."[38]

McNamara's initial certitude about improving southern morale was out of

character with his penchant for quantification and numerical systems analysis. He had

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[34] Robert S. McNamara with Brian VanDenMark, In Retrospect: The Tragedy and Lessons of Vietnam, (New York: Times Books, 1995), p. 266, including endnote 32 to that page.
[35] CIA memo, May 1967, Pentagon Papers, IV.C.7.(b), vol. II, p. 41.
[36] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 276.
[37] McNamara's Rolling Thunder review, July 30, 1965, Pentagon Papers, IV.C.3, p. 138.
[38] Memo, M. Bundy to President Johnson, Feb 7, 1965, Pentagon Papers, IV.C.3, p. 38.

cited supply requirement numbers to show that bombing could not significantly impede

supply movements and had used declining loss rates to justify graduated bombing.

McNamara had pointed out that there were no data to support his critics' opposing

arguments, yet in 1965 the Secretary had been confident of his intuitive ability to sense

bombing's unquantifiable morale benefits for South Vietnam. He presented no statistical

data to support his morale judgments. Possibly, McNamara was more comfortable with

quantifiable data, but was willing to resort to subjective arguments if necessary. He

showed a similar type of reasoning when he suggested the graduated bombing strategy

saved American lives compared to the military's recommended Rolling Thunder plans.

His morale opinions also paralleled his equivocation about judging bombing effectiveness

by the value of enemy facilities destroyed versus the cost of planes lost destroying them.

The reader may recall that McNamara claimed American lives lost *versus* target value

destroyed was a more appropriate ratio than purely financial cost comparisons when

measuring bombing's economic effectiveness. The Secretary's subsequent loss of faith in

bombing's morale potential was more in accord with his analytical penchant.

There was common ground between civilian and military morale assessments.

McNamara agreed with his generals who insisted American morale was fragile and

contingent upon sustained bombing. Acknowledging the adverse morale consequences

U.S. forces would face if bombing were curtailed, he noted in October 1966 that,

> Any limitation on the bombing of North Vietnam will cause serious
> psychological problems among the men who are risking their lives to help
> achieve our political objectives; among their commanders up to and
> including the JCS; and among those of our people who cannot understand
> why we should withhold punishment from the enemy. ... [General]

Westmoreland reports that the morale of his Air Force people may already be showing signs of erosion -- an erosion resulting from our current operational restrictions.[39]

Much like military commanders, administration officials increasingly saw bombing as a prop to support friendly forces' morale and a way to keep enemy morale from improving rather than a way to achieve positive ends such as demoralizing the enemy. Morale gradually acquired defensive trappings akin to saving American lives and reducing troop deployment needs.

The slight overlap in civil-military thinking did not preclude military attempts to argue against administration war policy on morale grounds. Senior officers who thought flying fewer sorties harmed American morale also insisted the ephemeral nature of bombing's morale effects on the enemy militated against the administration's graduated bombing policy. Much as McNamara had noticed bombing's diminishing morale potency among the South Vietnamese, American military leaders thought bombing's morale effect on the enemy was potentially dramatic at first, but faded with repeated applications. An abrupt, powerful campaign might stun the enemy and break his morale, but gradually increasing bombing would inoculate him against its effects. That belief formed another basis for assailing the graduated bombing strategy adopted to fight the air war. General Meyers complained in 1967 that gradually increasing pressure meant,

> the whole impact of airpower is not going to be as effective, because the people become hardened to it ... we have been slapping them on the cheek, over a long period of time, and we should have been hitting them on the jaw and knocking them out. In other words, a thousand planes in North

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[39] Memo from McNamara to the President, Oct. 1966, Pentagon Papers, IV.C.7.(a), p. 166.

Vietnam today is not going to have the impact that a thousand airplanes
would have had, say, 2 years ago.[40]

Meyers' diminishing returns argument paralleled analogous comments about flying

additional sorties and was reminiscent of McNamara's assertion that enemy resource

diversion peaked at a relatively low bombing intensity beyond which additional sorties

imposed decreasing marginal costs. Military and administration officials thus applied

conceptually similar economic analogies to justify divergent bombing strategies.

A RAND Corporation study contended graduated bombing had done more than

inure Hanoi to punishment. The report said slowly escalating attacks might have

strengthened the regime's political position by providing "a near-ideal mix of intended

restraint and accidental gore." Restraint had kept civilian casualties low enough to

prevent serious demoralization, but high enough to "cast the United States in the role of

the cruel and wicked imperialist aggressor."[41] The RAND analyst contended mobilization

had improved Hanoi's intelligence and internal security apparatus, enabling the

government to crack down on active or passive resistance to wartime measures.

Shortages of essential supplies may have reflected successful interdiction, but the

government could parlay its citizens' increased dependence on government goods and

services into firmer control. Threats to withhold food or medical attention from

uncooperative people helped enforce discipline and bolster the government's grip on

power. The study argued that even if morale had slipped, the government's coercive

powers would likely have blunted any attempts by disaffected citizens to oppose the war

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[40] Senate Preparedness Subcommittee, Part 5, Aug. 29, 1967, p. 504.

effort.[42] Second order success in terms of interdiction may therefore have been counterproductive in third order terms.

Bombing's perceived morale effects may have created a trap for policy-makers in two respects. First, bombing increases became irreversible. Even reductions attributable to seasonal weather changes seemed to threaten American and South Vietnamese morale. Critics who opposed resumption of bombing once the seasonal monsoons ended became another morale threat. Military leaders consistently favored more intense bombing. They envisioned few situations other than outright victory where reduced bombing would have been appropriate and blamed politically imposed operating restrictions whenever bombing did not convince Hanoi to accept American terms.

The second pitfall was subtler. According to the Pentagon Papers, "Although the real target of the early ROLLING THUNDER program was the will of NVN to continue the aggression in the South, the public rationale for the bombing had been expressed in terms of NVN's capability to continue that aggression."[43] Infiltration of enemy forces was the most obvious sign of enemy capability, so confining bombing to interdiction south of the Hanoi-Haiphong area permitted decision-makers to avoid the riskier alternative of attacking the vital urban targets that might have affected enemy morale the most. To make matters worse, those same fixed targets - such as the Haiphong harbor facilities - that might have had large morale values were also considered the most vital interdiction targets. The divergence between bombing's public and real rationales shifted attention

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[41] Hoeffding, p. 19.
[42] Hoeffding, p. 20.

toward interdiction effectiveness measurements that were not necessarily related to the

Hanoi leadership's morale. Interdiction effectiveness thereby became an ersatz sign of

effectiveness at lowering enemy morale.

Undermining North Vietnamese morale would hopefully set the stage for

negotiations. Policy makers considered the enemy's willingness to negotiate to be a sign

not only of effective bombing, but also of the war's overall success. The administration

hoped to attain its limited political goals through negotiations, but the North steadfastly

demanded an unconditional bombing halt as a precondition to any peace talks.

Negotiations, like bombing, are only a means to achieve political ends, but during Rolling

Thunder they gradually became an end unto themselves.

President Johnson consistently reiterated his eagerness to negotiate a settlement,

but his administration never resolved the question of whether bombing was a way to

induce the enemy to negotiate or a stumbling block that prevented negotiations. The

administration portrayed the periodic bombing pauses as efforts to open the way for

negotiations. Officials believed pauses afforded a "face-saving" way for North Vietnam to

start negotiating since, "It may be politically easier for North Vietnam to accept

negotiations and/or to make concessions at a time when bombing of their territory is not

currently taking place."[44] On the other hand, some of his advisors thought the North was

"unlikely to engage in meaningful discussions ... until US air attacks have begun to

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[43] Pentagon Papers, IV.C.7.(a), p.3.
[44] McNamara's Rolling Thunder review, Jul. 30, 1965, Pentagon Papers, IV.C.3, p. 139.

damage or destroy its principal economic and military targets."[45] Others thought bombing

was a bargaining chip to be traded away in exchange for the North Vietnamese ending

their infiltration. Assistant Secretary of Defense John McNaughton regarded bombing as a

way "to bring about negotiations" and "to provide a bargaining counter in negotiations,"[46]

but he doubted any feasible bombing program would persuade Hanoi to negotiate while

the current leadership was in charge and while the North anticipated winning in the South.

Therefore, he thought bombing might lead to negotiations after demonstrating the ability

to "reduce (not just increase the cost of) DRV aid to the South below what it would

otherwise be -- and hopefully to put a ceiling on it -- so that we can achieve a military

victory or, short of that, so that their failure in the South will cause them to lose

confidence in victory ... (Our World War II experience indicates that only at that time can

the squeeze on the North be expected to be a bargaining counter.)"[47]

McNaughton was not alone in highlighting bombing's utility as a bargaining

device. On April 27, 1966, former Army general, former ambassador, and current

presidential military advisor Maxwell Taylor described bombing as a "blue chip" to be

negotiated away in return for something concrete rather than as a precondition for

negotiations. The risk Taylor saw was that Hanoi might offer to negotiate at any time if

the U.S. stopped bombing and, "In this case, our Government would be under great

pressure at home and abroad to accept this precondition whereas to do so would seriously

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[45] Memo, CIA Director Raborn to Secretaries Rusk and McNamara, May 6, 1965, Pentagon Papers,
IV.C.3, p. 109.
[46] McNaughton memo, Jan. 18, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 34.
[47] McNaughton memo, Jan. 18, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 34.

prejudice the success of subsequent negotiations." Taylor continued his poker analogy by saying that if the U.S. stopped the bombing in order to start negotiations, "We would not have the coins necessary to pay for all the concessions required for a satisfactory terminal agreement"[48] - especially since an American bombing halt was so easily verified while a North Vietnamese infiltration halt was almost impossible to confirm. By October 1966, Secretary McNamara doubted bombing's effectiveness, but still believed "the bombing program would continue the pressure and would remain available as a bargaining counter to get talks started (or to trade off in talks)."[49]

Military officials held a different view of bombing's relationship to peace talks. Some hoped to bomb the North to the negotiating table. General Momyer's July 1967 personal letter to Gen. McConnell expressed that view by saying, "if we can keep going through the good weather months, there is the possibility the North Vietnamese may want to talk rather than continue fighting. In my judgment, there are some very definite indications the North Vietnamese are really hurting for the first time."[50]

The Americans found negotiations and bombing pauses inextricably linked, but in a paradoxical way. The enemy might negotiate if faced with military defeat brought on partly by bombing, but might lose interest in talks once the bombing that had helped bring him to the brink of defeat had stopped. Since the U.S. declined to invade North Vietnamese territory or overthrow the Communist regime, the prospect that bombing could force Hanoi to negotiate seemed remote. Inability to spur substantive negotiations

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[48] Memo from Maxwell Taylor to the President, Apr. 27, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 113.
[49] Memo, McNamara to the President, Oct. 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 164.

with graduated bombing prompted President Johnson to suspend bombing anywhere

except in the southern panhandle of North Vietnam effective April 1, 1968. The total

suspension of bombing in the North followed on November 1st.

Even after the campaign had ended, military officers thought bombing had helped

bring North Vietnam to the negotiating table. When interviewed in December 1968, Lt.

Col. John Rosenow, a MACV analyst who studied North Vietnamese publications and

broadcasts, said there was "no doubt in my mind at all that the only reason that Hanoi ever

went to Paris [to negotiate] was because of the impact of our bombing campaign in the

North, as limited as it was, plus the military achievements that we've accomplished in the

South" such as defeating the Tet Offensive.[51] Rosenow may not have known that the first

secret talks between American and North Vietnamese negotiators had begun on May 10,

1968.[52] Domestic political pressure had eventually induced the US to negotiate at the

Paris Peace Talks lacking even the bargaining chip of offering to stop bombing in return

for concrete North Vietnamese concessions.

The Hanoi government steadfastly refused to negotiate until after the U.S. stopped

bombing, but American officials sifted enemy radio broadcasts, publications, diplomatic

initiatives, and other communications for any signs of bombing-induced distress. In a rare

point of agreement, both military and civilian officials believed North Vietnamese public

statements – which Americans typically labeled propaganda - revealed how effective

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[50] Letter from Gen. Momyer to Gen. McConnell, Jul. 22, 1967.
[51] Lt. Col. John J. Rosenow, OHI transcript, Dec. 5, 1968, K239.0512-074, in USAF Collection, AFHRA, p. 23.
[52] McNamara, p. 295.

bombing was. Chapter 3 discussed how pilots like Col. Broughton deemed propaganda a valid effectiveness measure.[53] Higher-level officers expressed similar sentiments. Pacific Air Forces Commander General Hunter Harris remarked in early 1967, "I think that the North Vietnamese are beginning to really feel the effects of this [bomb damage] and certainly if you read the propaganda and the loud, the very loud outcries against the bombing, it was the same actually during the Korean War, during the European War, during the Pacific War ... Most of their loud propaganda efforts are against bombing because I think it really hurts them."[54] Harris' successor, General Ryan agreed, "Hanoi's tirade against the bombing provided a true indication of the impact of air attacks on the Communist regime."[55] A PACOM report noted the North's "vociferous reaction" to some airstrikes, concluding, "It is readily apparent that strikes close to Hanoi created grave concern that the sanctuaries were no longer inviolate – an obvious ploy by the NVN leaders to stop further attacks. ... The best testimonial to the effectiveness of Rolling Thunder is the monumental effort Hanoi is making to stop it."[56] At the highest military level, a Headquarters, USAF report noted, "The massive, well-coordinated world-wide communist diplomatic and propaganda effort to pressure the United States to cease bombings, testifies to the fact that US combat operations are seriously hurting NVN."[57] The JCS liaison officer to the White House asserted, "the tremendous propaganda

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[53] See Col. Jack Broughton, Thud Ridge, (Philadelphia and New York: J. B. Lippincott Co., 1969), p. 87.
[54] Gen. Hunter Harris, OHI transcript, Feb. 8, 1967, K239.0512-377, in USAF Collection, AFHRA, pp. 39-40.
[55] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 129.
[56] Rolling Thunder Digest, Oct. – Dec. 1966, p. 8.
[57] Headquarters, USAF, "Air Operations - North Vietnam," Apr. 27, 1967, K143.5072-90, in USAF

campaign which the North Vietnamese mounted against the bombing campaign was an

indication that the North Vietnamese were hurting, that they were paying a penalty."[58]

Secretary McNamara also interpreted enemy propaganda aimed at stopping the

bombing as a clear sign the bombing was hurting North Vietnam. When asked during his

Stennis Committee testimony how he knew bombing was working, he replied, "we believe

it [bombing] helps us; and I think the best evidence of that is Hanoi's strenuous and

vigorous propaganda campaign to force us to stop it." Earlier that day, the Secretary had

told the committee, "There can be no question that the bombing campaign has and is

hurting North Vietnam's warmaking capability. Accordingly, they are using every

propaganda means to stop the bombing."[59] Agreement that propaganda revealed

bombing's efficacy seemed practically unanimous.

The apparent civil-military agreement about propaganda's validity as an

effectiveness indicator was superficial because administration and military officials drew

opposing conclusions from the same evidence, much as they did when evaluating data

about damage repair and aircraft loss rates. McNamara thought enemy propaganda

validated graduated bombing, while the military thought if the enemy protested against

limited bombing, then heavier bombing would produce even stronger protests that would

reflect greater results. A 1966 PACOM report commented, "Indications of what heavier

air strikes would do are reflected in Hanoi's outcry over present bombings. The theme

'stop the bombing' has been made the first prerequisite to any negotiations in Communist

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Collection, AFHRA Part I, Tab A, p. 8.
[58] Ginsburgh, OHI transcript, p. 59.

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public pronouncements around the world."[60] Admiral Sharp thought the administration

was excessively attuned to enemy propaganda because, "Hanoi turned on the propaganda

and these guys were more sensitive of the propaganda from Hanoi than they will ever

admit. They just were scared to death that public opinion would get at them."[61]

Sharp was referring to domestic public opinion, but since Hanoi's propaganda was

addressed to a worldwide audience, the propaganda may have exaggerated bombing's

effectiveness. Countries such as Great Britain were American allies, but publicly opposed

the bombing and urged the U.S. to reduce it. The North Vietnamese probably sensed

American vulnerability to world opinion and international pressures. Hanoi's vigorous

propaganda offensive against the bombing may therefore have been partly a shrewd

diplomatic strategy rather than a sign that the North was really suffering severe distress.

Military officials usually used enemy propaganda to justify calls for heavier

bombing, but they perceived mixed propaganda consequences whenever the U.S. paused

or scaled back the bombing. Lieutenant Colonel John Rosenow, a publications and

broadcasts analyst, deemed pauses counterproductive because, "Almost invariably they

[Hanoi leadership] would quickly come out with a propaganda theme to the effect that

these bombing pauses meant that we were [in] a stalemate. They emphasized the word

stalemate consistently ... and they would always interpret any reduction of effort such as

[59] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, pp. 333 and 277.
[60] Rolling Thunder Digest, Oct. – Dec. 1966, p. 26.
[61] Adm. U. S. G. Sharp, OHI transcript, Feb. 19, 1971, K239.0512-409, in USAF Collection, AFHRA, p. 17.

the bombing pauses as an indication that we're faced with a stalemate."[62] Once the U.S.

confined bombing to the southern panhandle in 1968, military officials began noticing

another shift in Hanoi's propaganda. The regime boasted of imminent victory and

exhorted its citizens to greater efforts. Pacific Command's rather hopeful interpretation

was, "It appears that as a result of the bombing halt Hanoi is probably faced with an

overall relaxed attitude on the part of its populace and is resorting to these themes in order

to restore a sense of urgency to its people."[63] Evidently, even bombing halts were clouds

with silver linings that could have some adverse morale effects by lulling enemy

populations into a false sense of security and undermining their willingness to endure

further sacrifices. Propaganda was a vague success indicator and military officials found

creative ways to interpret it.

Separate discussions about deterrence, morale, negotiations, and propaganda risk

obscuring the close connections military officials perceived between those factors.

Commanders occasionally lumped multiple third order concepts together when explaining

the results they were trying to achieve. Major General Gordon Blood, Seventh AF

Deputy Chief of Staff for Operations, remarked, "one of the main things we were after

was the pressure on the central government of North Vietnam by striking day and night,

either harassment or destruction or deterrence around Hanoi, and causing the air raid

sirens to go off regularly and causing the morale to keep being reduced by the amount of

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[62] Rosenow, OHI transcript, p. 6.
[63] Rolling Thunder Digest, Apr. – Jun. 1968, p. 7.

strikes going on continuously."[64] Blood did not mention how to measure pressure,

deterrence, or morale, however. A PACOM report published in early 1968 displayed a

fairly comprehensive overview of third order effects when it concluded,

> In a sense, the gradual extension of the Rolling Thunder campaign
> since 1965 has allowed the [Hanoi] regime to continually readjust to each
> phase and has instilled a regime belief that the country can continue to
> resist and adjust as necessary until the U.S. tires of the war. The possibility
> that communist psywar [psychological warfare] efforts will at least
> influence, if not force, the U.S. government to make concessions beneficial
> to Hanoi probably strengthens the NVN regime's determination to await its
> propaganda results. Nevertheless, the regime probably continues to base
> such decisions mainly on its evaluation of the political and military situation
> in South and North Vietnam, on developments with other communist
> states, and on its own estimate as to NVN capabilities and prospects. In
> the final evaluation, it is Hanoi that must be convinced of the futility of its
> present course. Not only must the direct and indirect effects of the
> bombing be taken into consideration, but also Hanoi's own appraisal or
> self-delusion of success in the South and estimate of U.S. resolve to
> continue to prosecute the war to a successful conclusion.[65]

At the headquarters level, the use of third order criteria reflected underlying civil-

military disagreements about first and second order criteria. A veneer of agreement often

existed about which factors indicated bombing's success, but Air Force and other military

officials consistently interpreted data in ways contrary to Johnson Administration views.

Both parties mingled persuasion with detached contemplation. Although they used similar

terminology, civilian and military leaders often seemed to speak past each other. Even

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[64] Maj. Gen. Gordon F. Blood, OHI transcript, Apr. 6, 1970, K239.0512-257, in USAF Collection, AFHRA, p. 42.

[65] Rolling Thunder Digest, Oct. – Dec. 1967, p. 10.

when looking at the same data, they frequently drew drastically different conclusions. The

next chapter will examine the overall conclusions senior officials reached when integrating

together the various effectiveness criteria examined during the previous several chapters.

CHAPTER 9 - OVERALL EFFECTIVENESS ASSESSMENTS

Flying unit personnel assessed their own units' performance and often criticized specific ways Rolling Thunder was being conducted, but offered few comprehensive campaign effectiveness assessments. That tendency is neither surprising nor unhealthy since those people were primarily fighting the war rather than analyzing it. Thinking about the bombing's fundamental efficacy was mostly the responsibility of high-ranking officials. A simple model to explain how leaders form overall campaign evaluations might assume they integrate the results of numerous separate engagements according to a consistent set of criteria. A preponderance of successes achieved over time would mean the campaign was leading to success. Conversely, recurring small failures would add up to overall failure. No such simple model describes the way policy makers developed their opinions about Rolling Thunder's effectiveness. Senior civilian and military leaders articulated sophisticated, but conflicting ideas about overall results. In some instances, they recounted the campaign's numerous perceived shortcomings, but still insisted the overall results were favorable. Their ideas were based on rational analyses and practical experience, but were strongly colored by politics and other influences.

Bombing effectiveness is partly in the eye of the beholder, so opinions about Rolling Thunder's aggregate results formed a broad spectrum. Strong critics such as Raphael Littauer and Norman Uphoff implied that the campaign's failure to achieve its

stated objectives was evidence of bombing's inherent ineffectiveness.[1] Conversely, most

military leaders held that bombing is an extremely potent instrument, but must be applied

vigorously to achieve meaningful results. An intermediate view, gradually adopted by

people like Secretary of Defense McNamara, claimed that bombing works against enemies

who have advanced industrial economies, but not against primitive agricultural nations

such as North Vietnam - especially if they receive extensive outside aid. Senior American

policy makers tried to determine bombing's utility as the campaign progressed, but

consensus proved elusive. Opinions split along several lines. Military commanders tended

to disagree with civilian officials, and high-ranking officials sometimes disagreed with

lower ranking ones. This investigation emphasizes the military perspective, but civilian

officials like Secretary McNamara provide a necessary counterpoint.

When discussing Rolling Thunder, military commanders performed a delicate

balancing act that mingled criticisms of specific administration bombing restrictions with

tepid endorsements of the overall policy. Political maneuverings the generals hoped

would gain approval for the vigorous bombing campaign they wanted generated confusing

signals about the existing campaign's efficacy. Although they clothed their actions in

virtues such as professional duty, the commanders' willingness both to criticize and

support administration policy obscured Rolling Thunder's actual effectiveness in a manner

reminiscent of the mixed conclusions found in the CIA/DIA An Appraisal of the Bombing

[1] Raphael Littauer and Norman Uphoff, eds., The Air War in Indochina, (Boston: Beacon, 1972).

of North Vietnam reports. This observation does not imply that the generals emulated the

CIA/DIA reports, but merely that the generals were also ambivalent.

Much as they exuded confidence in overall interdiction effectiveness while

bemoaning restrictions they felt made the effort less effective than it could have been,

senior officers simultaneously claimed good overall results for Rolling Thunder while

lamenting bombing restrictions they thought marred the campaign. They protested the

graduated strategy and tirelessly urged heavier attacks, but usually stopped short of

claiming the administration's policy was failing. Senior officers were instead sanguine

about Rolling Thunder's overall prospects, arguing the bombing would be even more

effective if political restrictions were eased. Moments before he had characterized the

campaign as "crippled" by restrictions, Marine Corps Commandant Gen. Greene had

voiced a prevalent Pentagon opinion that, "The air campaign ... has been most useful in

supporting our overall objectives, and ... it could have made a greater contribution if a

stronger campaign as envisioned by the destruction of the 94 target list in 1965 had been

carried out."[2] Writing just weeks before the Tet Offensive, Seventh AF intelligence chief

Brig. Gen. Philpott concluded, "My assessment is a dark one for the enemy and a

cautiously optimistic one for free world forces. ... North Vietnam is approaching a

desperate situation." Philpott thought continued vigorous bombing in the North and

ground fighting in the South would "push North Vietnam further down the road of

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[2] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings
before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 5, Aug. 28, 1967, p. 452.
(Cited hereafter as "Senate Preparedness Subcommittee.")

desperation," but any relaxation of American pressure would be a serious error that would

produce instead "a long, slow engagement of attrition."[3]

Generals Green and Philpott had qualified their assessments, but others sometimes

made statements that appeared to support the administration's bombing policy. The

summer of 1967 marked an optimistic time. Testifying before the Stennis Committee that

August, Air Force Chief of Staff Gen. John McConnell asserted, "I believe we have made

highly effective use of airpower against North Vietnam,"[4] and Seventh AF Commander

Gen. Momyer stated, "I have heard no dissatisfaction with the target system that the pilots

are currently hitting."[5] Admiral Sharp seemed gratified to report to the Stennis

Committee that bombing had "brought extensive destruction or disruption of North

Vietnam's war-supporting resources" because most military complexes had been damaged

and armed reconnaissance had "taken a heavy toll" of enemy vehicles.[6]

The military leaders even defended the Johnson Administration's Rolling Thunder

policy against accusations it was ineffective. In August 1967, Senator Stuart Symington,

former Secretary of the Air Force and a staunch air power supporter, quoted a speech

from House minority leader Congressman (later to be President) Gerald Ford who had

noted the recent "massive American air strikes against North Vietnam" seemed to be

having little effect. Ford had said,

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[3] Brig. Gen. Jammie M. Philpott, End-of-Tour Report, Dec. 6, 1967, K740.131, in USAF Collection, AFHRA, p. 19.
[4] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 201.
[5] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 169.
[6] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 6.

when one reads the official spokesman's account of what was
accomplished on those air strikes, nothing is changed. Strategic bombers
from Guam drop their bombs on North Vietnamese weapons positions,
base camps, storage areas and trails. U.S. pilots attack troop
concentrations, three artillery pieces, one bunker, two armored vehicles,
one tank, five trucks... These are all the details given for what is touted as
the biggest American air assault of the Vietnam War. Mr. Speaker, we are
still pulling our best punch in North Vietnam.[7]

After quoting Congressman Ford, Senator Symington asked Admiral Sharp, "Does

that not, in effect, prove the relative expense and ineffectiveness of what has been going

on because of the restriction and the rules" governing bombing. Surprisingly, CINCPAC

replied, "I do not think it does. Every day I read what the pilots have done the day before,

taking the pilot's reports, and I must say that day in and day out it is pretty significant."[8]

Most Stennis Committee members endorsed the military's calls for heavier

bombing. Symington had offered Sharp a highly sympathetic forum where he could have

registered his complaints about the air war in public, in direct response to a Senator's

question, under oath, and without fear of being labeled insubordinate, but the admiral had

declined the invitation. Conflicting motivations may have contributed to Sharp's

remarkably mild answer. Sharp had not risen to high command by complaining about

obstacles. Like most other successful people, he had a "can-do" attitude. If he had

bewailed the adverse effects of the restrictions under which he labored, he would also have

been criticizing his own conduct of the war. The admiral might have felt he was running

the war fairly well and expected to do even better as bombing restrictions gradually and

progressively eased. He might also have feared that publicly criticizing administration

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[7] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 71.

policy would risk ending additional easing of bombing restrictions. Although he habitually

exhorted the administration to close Haiphong harbor and take other steps he believed

would increase bombing effectiveness, CINCPAC did not at that time project the image of

a Cassandra whose warnings of impending defeat were going unheeded.

Admiral Sharp's view seemed to typify high command attitudes about bombing.

Joint Chiefs of Staff Chairman Gen. Wheeler assured the Stennis Committee that

newspaper stories claiming military men doubted Rolling Thunder's effectiveness were

erroneous and that "certainly there is no military man in what I would call a position of

rank and authority and responsibility who has that view. In fact, I believe that

unanimously we have the opposite view."[9] The general's comment is surprising in view of

the military's supposed chaffing under political restrictions, and hints at a possible

divergence between the opinions held by senior officers and some of their subordinates.

The origin of the newspaper stories is unknown, but one could speculate that pilots who

judged armed recce missions an "exercise in futility" (to use Admiral Sharp's phrase)

because they rarely saw worthwhile targets to bomb were one possible source.[10]

Rolling Thunder commanders almost always argued bombing North Vietnam was

the correct policy. They thought the campaign was helping to win the war and considered

bombing such an effective tool that it could generate useful results even if misapplied due

to the administration's ineptitude. The USAF Chief of Staff touted Rolling Thunder's

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[8] Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 71.
[9] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 135.
[10] See Senate Preparedness Subcommittee, Part 1, Aug. 9, 1967, p. 72. Adm. Sharp said missions that saw no vehicles were successful because armed recce was supposed to prevent enemy traffic.

successes, but in a 1969 interview he remarked, "I don't think Mr. McNamara understood

air power or its application very well. ... In fact, I don't think that there was at that time

anybody in the Office of the Secretary of Defense who understood the application of

tactical and strategic air power. At least, not the way I understood it."[11] Colonel Edelen,

an Air Staff planner, was also convinced Rolling Thunder was successful, but lamented the

White House desire to micromanage targeting rather than making broad policy choices

and leaving the details to CINCPAC.[12] About two years after Rolling Thunder had ended,

Admiral Sharp thought that even "with all these silly restrictions at the end of 1967 we

damn near had them beat. In November 1967, the Communists were on the ropes and the

economy of North Vietnam was in bad shape, but of course in March 1968 we gave up

and let them off the hook and granted them the biggest victory they ever got right there

when we stopped the bombing."[13] The contrast between the senior officers' overall

optimism and their persistent complaints about restrictions raised a nagging question. If

the restrictions were so harmful, why claim bombing was working so well?

The officers themselves have often invoked their sense of professional duty when

reconciling their support for the President's overall Rolling Thunder policy with their

criticisms of that policy's details. When Gen. McConnell retired in 1969, General

Momyer sent him a personal letter in which Momyer wrote, "I suppose a military man will

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[11] Gen. John P. McConnell, OHI transcript, Aug. 28, 1969, K239.0512-1190, in USAF Collection, AFHRA, p. 39.

[12] Col. Henry H. Edelen, Jr., OHI transcript, Jan. 27, 1970, K239.0512-243, in USAF Collection, AFHRA, p. 17.

[13] Adm. U. S. G. Sharp, OHI transcript, Feb. 19, 1971, K239.0512-409, in USAF Collection, AFHRA, p. 17.

always be in the dilemma of supporting a policy even though he knows it surely restricts

the capacity of military forces to produce the desired effect. One has no alternative but to

support the policy and take the knocks that inevitably follow when military forces don't

produce the desired effects within the constraints of the policy."[14] That sentiment is

laudable and probably played a role, but less lofty considerations may also have

contributed to the contradictory assessments.

Pragmatic evaluation of the politically feasible strategy alternatives may have

persuaded military leaders that the President's policy was not a very good one, but it was

the best bombing strategy available. President Johnson's policy was a compromise

between "hawks" who wanted vigorous military action and "doves" who wanted to scale

back the war. Therefore, part of the senior officers' willingness to defend administration

policy may have come from fear of even more severe restrictions if the doves gained the

upper hand in policy formulation. Bombing critics began claiming that all the important

North Vietnamese targets had been destroyed, so a more intense campaign would not

bring greater success. In the military's view, restrictions that precluded strikes against

some targets kept Rolling Thunder from reaching maximum effectiveness, but at least the

administration continued approving more targets, and the air commanders did not want

the critics to block additional approvals. General Momyer remarked after the war, "it was

expected by most commanders from Sharp on down that it was only a matter of time until

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[14] Letter from Gen. Momyer to Gen. McConnell, Jul. 3, 1969, Gen. McConnell Correspondence, 168.7102-15, in USAF Collection, AFHRA.

the most important targets would be released."[15] Major General Ginsburgh echoed

Momyer's sentiment and added that CINCPAC and the JCS "figured, well, half a loaf is

better than none and if we get the half a loaf this week, maybe next week we'll be able to

get the rest of the loaf in time to make this an effective campaign, militarily."[16] Joint

Chiefs of Staff Chairman Gen. Wheeler also seemed content to gain gradual political

approval for expanded bombing. During the Stennis Committee hearings when Senator

Jack Miller proposed reducing sortie rates in exchange for permission to strike fewer, but

more valuable targets, General Wheeler declined, saying he would rather "slowly but

surely obtain approval on the other points [of the desired bombing program]."[17] Senior

officers disliked political restrictions, but the prospect of the President gradually lifting

them left room to hope for eventual victory.

The President's policy also promised to continue bombing on a fairly consistent

basis. Military leaders knew the North Vietnamese had a remarkable ability to repair

damage, so effective bombing did not mean "once targets are hit, they can be crossed off

the list and forgotten."[18] General McConnell advocated restriking targets to apply

relentless pressure because "If you ever release the pressure on them, they will be just that

much better off in terms of capability to supply their own requirements in North Vietnam

and to infiltrate more people and materiel into South Vietnam. If there weren't a new

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[15] Gen. William W. Momyer, Air Power in Three Wars, (Washington, D.C.: Department of the Air Force, 1978), p. 23.
[16] Maj. Gen. Robert N. Ginsburgh, OHI transcript, May 26, 1971, K239.0512-477, in USAF Collection, AFHRA, p. 39.
[17] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 151.
[18] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, pp. 126 and 147.

target left, you would still have to stay in there and fly."[19] If restrictions precluded

eliminating the sources of men and supplies, then bombing transportation networks was

still a good way to impede infiltration. The generals wanted bombing to continue, and

President Johnson fulfilled their minimum hopes. The administration's willingness to resist

domestic critics who advocated even more stringent bombing restrictions - or worse yet,

an outright halt - could have made the President's policy seem the lesser of the

prospective policy evils facing military commanders.

The hope of eventually gaining approval for the unrestricted bombing they thought

would be most effective may even have blunted Pentagon opposition to the occasional

bombing pauses the President ordered - at least early in the campaign. President Johnson

initially resisted mounting political pressure in the spring of 1965 to stop bombing, but

realized the modest initial attacks were not bringing Hanoi to terms. The North still

expected to conquer the South by force and seemed uninterested in negotiations. A

bombing pause emerged as one possible way to defuse domestic and international criticism

while setting the stage for the bombing escalation President Johnson then believed would

be needed to convince the North victory was unattainable by military means. Therefore,

"if the conflict was going to have to be expanded and bombing intensified before Hanoi

would 'come to reason,' it would be easier and politically more palatable to do so after a

pause, which would afford an opportunity for the enemy's intentions to be more clearly

revealed."[20]

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[19] Senate Preparedness Subcommittee, Part 3, Aug. 22, 1967, p. 214.
[20] U.S. Department of Defense, United States - GVN Relations, (Washington, D.C.: Gov't Printing Office,

The Johnson Administration may have viewed pauses as no-lose political propositions potentially able either to open negotiations or to facilitate further bombing escalation, but officials wanted to portray different reasons for the pauses to different audiences. The public was to see pauses as demonstrations of restraint, good faith, and reasonableness, but military commanders were to see them as preludes to intensified bombing. The President was interested in countering public criticism, but Secretary McNamara's message informing the field commanders about the first bombing pause in May 1965 said the pause was "to observe reaction of DRV [Democratic Republic of Vietnam] rail and road transportation systems."[21] Presumably, if reconnaissance showed enemy movement, bombing would resume. The administration was highly sensitive to possible accusations the pause was actually a prelude to escalation, so bombing intensified gradually after the May 1965 pause. The generals' impression that the pause was a ploy to justify heavier bombing may have muted their criticisms of a policy they might otherwise have opposed more vigorously.

Commanders remained rather tolerant of subsequent pauses provided the interruptions seemed unlikely to interfere significantly with planned operations. The monsoon cycle severely limited bombing during certain months, so those bad weather periods seemed like the least harmful times to declare pauses. When the President halted bombing above 20° North on April 1, 1968, General Momyer was not initially troubled because the northeast monsoon was interfering with flying anyway. Years later Momyer

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1972), IV.C.3, p. 107. (Cited hereafter as "Pentagon Papers.") Emphasis in original.

[21] Message, McNamara to Maxwell Taylor and military commanders, May 10, 1965, Pentagon Papers,

admitted, "I supported the proposal for a bombing halt because I realized that the weather alone would probably cause us to cancel all but a few hundred sorties and because we were not being permitted to strike the most valuable targets in any case. I felt that stopping the bombing above the 20th parallel to test the intentions of the North Vietnamese would have a minimum effect on the air campaign if the bombing halt took place in the month of April."[22] Momyer evidently expected the restriction to be only temporary and anticipated resuming bombing by the time the weather improved. Although he made that remark in his memoirs published after the war, he did not say anything about how the restrictions might have affected the campaign if they continued past April.

Rolling Thunder's vague objectives also gave military officials some rhetorical maneuvering room to claim bombing was effective despite apparent inconsistencies between their overall optimism and their criticism of restrictions. Contrasting the military's supposedly limited claims of what bombing could achieve with the unrealistic expectations some critics harbored was one approach. Major General Ginsburgh pointed out that America's "statement of objectives does not indicate that we expected that the bombing would bring North Vietnam to her knees." Ginsburgh thought public support for bombing eventually faltered because most Americans did not recognize the divergence between bombing's maximum potential and the war's limited objectives. He said, "I think many Americans just assumed that if we were bombing, we were bombing with the objective of bringing North Vietnam to its knees; whereas, in fact, that was not the case.

IV.C.3, p. 112.
[22] Momyer, <u>Air Power in Three Wars</u>, p. 27.

... the primary [apparent] failure lies [in] the fact that it was expected by many people to do more than it was ever intended to do."[23]

Interdiction was a prominent Rolling Thunder component, so senior officers frequently applied interdiction effectiveness standards when assessing the entire campaign's results. Colonel Edelen exemplified that trend. He thought bombing had "accomplished to a degree all it set out to do ... I think the limitations on the bombing ... definitely affected our success in the air campaign. ... However, I think that our successes in the air campaign were significant and we did accomplish just about everything that we set out to do." Like Ginsburgh, Edelen based his argument on the campaign's stated objectives noting, "I think it's very important in an analysis of this sort to look at just exactly what the objectives of the air campaign were."[24]

The link between interdiction and the campaign's overall results became clearer when Edelen supported his broad conclusion by saying that bombing opponents had incorrectly insisted bombing was supposed to stop infiltration. When enemy movements persisted, opponents had wrongly concluded bombing had failed. Edelen argued, "And yet if you read the record nowhere did the JCS ever go on record with a statement that one of the objectives of the air campaign was to stop the flow of materials."[25] He added that neither the President nor the Secretary of Defense had made such a claim either. Those officials had only claimed bombing would reduce the flow. Edelen maintained that interdiction could never have "achieved all that its critics claimed that it was designed to

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[23] Ginsburgh, OHI transcript, pp. 58 and 63. "Apparent" and "in" are bracketed in the original.
[24] Edelen, OHI transcript, pp. 112 and 71.

virtually impossible so long as he is willing to pay an extravagant price in lost men and

supplies."[27] Momyer did not explicitly say those interdiction misconceptions applied to

the whole campaign, but he certainly knew interdiction was the campaign's largest feature.

Having established narrow grounds for claiming overall success by extrapolating

interdiction's results to cover the whole campaign, Air Force leaders tried to expand their

small beachhead into a more expansive claim. Bombing's official objectives did include

applying steadily increasing pressure and making continued support of the insurgency as

difficult and costly as possible, so a PACAF report was able to take consolation in saying,

"The ROLLING THUNDER operation did increase the pressure against NVN within the

confines of the operational limitation required by higher authority, and made further

support of the Viet Cong insurgency difficult and costly." The report further claimed,

"Within the confines of restrictions placed on it by higher authority, ROLLING

THUNDER accomplished its military objectives as long as it was permitted to continue."[28]

General Ginsburgh stated, "It seems to me that our bombing campaign was eminently

successful in view of the specific objectives it was designed to achieve" because it "denied

the enemy a sanctuary," was "exacting a penalty," "increased the cost to North Vietnam,"

compelled expenditures on air defenses, and diverted manpower to repairs.[29] Colonel

Henry Edelen echoed that idea by saying, "the air campaign was to increase the cost to the

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[27] Momyer, Air Power in Three Wars, pp. 188 and 337-338.
[28] Headquarters PACOM, Directorate, Tactical Evaluation, CHECO Division, "Rolling Thunder, Jan. 1967 – Nov. 1968," pp. 15-16 and 40. (Cited hereafter as "CHECO Report" followed by title.) Emphasis in original.
[29] Ginsburgh, OHI transcript, pp. 59-60.

enemy of his continued aggression in the South. It goes without saying, since we destroyed certain of his materials, that the air campaign did increase his cost."[30]

Military officials also speculated about unprovable outcomes such as how much more successful bombing could have been if intensified or continued longer. Former 2nd AD commander General Moore stated in 1969, "the air has been as effective as it was allowed to be, overall. It could have been a great deal more effective and could have been an extremely decisive factor, had it been allowed to be used the way it was designed and the way it was capable of being used." Moore also remarked, "I think we could have had that war over in from three to six months without question" if the administration's "intolerable" bombing restrictions had been removed.[31] The Chief of Staff said in a 1970 interview, "We could have won the war in 1966 if we wanted to win a war."[32] He suspected the President was engaging the North in more of a political dispute than a war.

President Johnson's sudden strategy shifts stunned air leaders, generating additional opportunities for "what if" speculations. The April 1968 order restricting bombing to the southern panhandle utterly surprised senior officers such as PACAF commander General Ryan who first heard about it while sitting on his porch listening to the news.[33] The policy shift came shortly before the northeast monsoon season began giving way to the dry season's better flying weather. General Momyer doubted the

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[30] Edelen, OHI transcript, p. 74.
[31] Lt. Gen. Joseph H. Moore, OHI transcript, Nov. 22, 1969, K239.0512-241, in USAF Collection, AFHRA, pp. 65 and 8.
[32] Gen. John P. McConnell, OHI transcript, Nov. 4, 1970, K239.0512-371, in USAF Collection, AFHRA, p. 3.
[33] Gen. John D. Ryan, OHI transcript, May 20, 1971, K239.0612-476, in USAF Collection, AFHRA, p.

restriction would have mattered much during April's marginal weather, but other officers took a longer view and speculated what might have happened if the bombing had continued as before. Their predictions about such an alternative future were highly optimistic. Colonel Edelen was convinced, "The [1968] campaign would have been even more successful during the next six month good weather period than it had been during all the previous months of bombing."[34] Former Seventh AF Deputy Chief of Staff for Operations Maj. Gen. Blood thought if the U.S. had continued extensive ground combat in the South, "another good summer [of bombing] in 1968, [and] we may have been able to break him [the enemy] down as far as being able to move supplies through."[35] A few weeks after the November 1, 1968 end of Rolling Thunder, MACV Headquarters analyst Lt. Col. Rosenow opined, "I think that our bombing campaign in the north despite the severe restrictions that we were faced with was beginning to extract a pretty heavy toll in terms of manpower economic capacity and the will to resist. I am a strong believer that we stopped the bombing at a point where if we had continued it for just a short, indefinite period, I am convinced that we could have" seen clear evidence of success.[36]

Senior officers could claim success within carefully circumscribed factual bounds or by selectively extrapolating past trends into the future, but the overall national objective was to cause Hanoi to cease its effort to conquer the South and that outcome had clearly

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[34] Edelen, OHI transcript, p. 112.
[35] Maj. Gen. Gordon F. Blood, OHI transcript, Apr. 6, 1970, K239.0512-257, in USAF Collection, AFHRA, p. 41.
[36] Lt. Col. John J. Rosenow, OHI transcript, Dec. 5, 1968, K239.0512-074, in USAF Collection, AFHRA, p. 22.

not been achieved. Rolling Thunder may technically have been accomplishing part of its stated purpose, but the commanders were not satisfied and hoped for more. They were also willing to accentuate positive developments, downplay problems, and bide their time.

The generals' tentative defenses of administration policy, patient waiting for additional targets, calls for maintaining relentless pressure, tolerance for bombing pauses, and persistent resourcefulness in claiming at least partial success for the campaign all reflected their understanding that the war would be protracted. The perceived ability to achieve quick victory has been a traditional air power virtue. Post World War I air power advocates had specifically envisioned aerial bombardment as a way to avoid endless trench fighting by directly attacking the enemy's war-supporting industries. A quicker end to the fighting would presumably ensue, but that vision seemed less compelling during Rolling Thunder. General Ryan said, "The spectre of a long war should be treated as being intolerable,"[37] yet the military's optimistic outlook in Vietnam was not predicated on rapid results. Secretary McNamara's dictum, "The tragic and long drawnout character of that conflict in the south makes very tempting the prospect of replacing it with some new kind of air campaign against the north. But however tempting, such an alternative seems to me completely illusory"[38] overrode military commanders' demands for a quick, devastating air campaign. The JCS acquiesced in the air war's gradual expansion and regarded with apparent equanimity the prospect of only slow progress toward victory. The graduated

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[37] CHECO Report, "Rolling Thunder, July 1965 - December 1966," p. 132.
[38] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 282.

bombing policy implied a war of attrition rather than a knockout blow from the, air and

military leaders were prepared to endorse that strategy.

Some commanders thought the intense bombing they had originally recommended

could have won the war quickly, but that graduated bombing had precipitated an

unfavorable shift in the war's basic character. Prospects of a short war faded within

months, but CINCPAC still expected to win. By January 1966, Admiral Sharp had

acknowledged Rolling Thunder "has not forced Hanoi to the decision which we sought,"

namely "to cease aggression through an increasing pressure brought to bear through

carefully timed destruction of selected resources, accompanied by threat of greater

losses." He felt the explanation for Hanoi's recalcitrance was "the nature of the war has

changed since the air campaign began," so that Hanoi would now continue supporting the

VC until "denied the capability to do so."[39] Far from concluding the situation was

hopeless, he thought continued escalation could compensate for the false start represented

by graduated bombing. Curiously, his comment implied the North Vietnamese had not

originally intended to support their VC allies as long as possible, but faulty American

policy had transmuted the war from a relatively quick struggle into a protracted one.

Senior officers made other statements reflecting their expectations of a protracted

air war. In 1967, Gen. Wheeler said, "I believe that the ultimate success of our effort is

going to depend upon a steady pressure day after day, weather permitting; night after

night, weather and our money permitting, until we really attrite these people to where they

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[39] Cable from CINCPAC to JCS, Jan. 12, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 31.

cannot support their war in the South."[40]   After insisting air and sea power could have

won the war in 1966 had they been unleashed, Gen. McConnell added, "But that wasn't

the kind of war we were fighting. We weren't fighting to win a war. We were fighting to

do something else – to settle the political issue."[41]   Years later, Gen. Dale Sweat, Seventh

AF Director of Combat Operations, recalled Gen. Momyer's alleged belief that "since we

were not going to be able to win this war anyway [due to political restrictions], let's fight

a war of controlled attrition so we don't lose any more firstline pilots and aircraft than we

absolutely have to."[42]

Part of the commanders' lingering optimism that a protracted air war might

succeed was founded on expected time lags between first order effects such as trucks and

bridges destroyed and the manifestation of second order effects such as logistical

shortages. As described in Chapter 6, the 1966 POL campaign illustrated similar

reasoning. Senior officers often used the word "cumulative" to express the notion that all

the first order damage must somehow add up to eventual success. In 1967, Seventh AF

commander General Momyer remarked, "our effectiveness in my judgment has

tremendously increased; and I am optimistic that the application of our airpower is now

beginning to take full effect and the gains will always be cumulative. It has taken time for

these things to start showing, and I think the essence of this is now beginning to be felt."[43]

A PACAF report estimated Rolling Thunder had cut industrial output by as much as 50%,

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[40] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, p. 151.
[41] McConnell, OHI transcript, Nov. 4, 1970, p. 10.
[42] Gen. Dale S. Sweat, OHI transcript, Feb. 15, 1984, K239.0512-1572, in USAF Collection, AFHRA, p. 78.

but concluded, "Although the reduced industrial production caused some immediate

adverse effects on the NVN economy, the longer term cumulative effects were considered

to be of greater significance." That same report later noted, "A cumulative effect could be

expected from successful attacks against higher priority targets."[44] A 1967 PACOM

report noted North Vietnam's mounting supply distribution and economic problems and

concluded, "Such pressures and their effects are cumulative and, applied over an extended

period of time, are likely to be more decisive than a reduction in the flow of arms into

SVN in breaking Hanoi's determination to continute [sic] support of their aggression in

the south."[45]

The nature of the postulated cumulative effects was often vague, making the

terminology seem a way of claiming bombing would eventually pay off in some

unspecified way if only the campaign were continued long enough. A CHECO Report

seemed to use the term as a refuge from measurement imponderability when it said, "The

cumulative effect of the selective bombing of North Vietnam targets cannot be currently

assessed, but it will probably have considerable impact on communist plans for the future

conduct of the war."[46] Rolling Thunder Digest gave another example when it noted, "The

damage inflicted upon North Vietnamese targets by RT operations continues to be

cumulative in nature, particularly in those areas where direct measurement of damage is

[43] Senate Preparedness Subcommittee, Part 2, Aug. 16, 1967, pp. 168-169.
[44] CHECO Report, "Rolling Thunder, January 1967 – November 1968," pp. 14 and 43.
[45] Headquarters PACOM, Operations Division, Rolling Thunder Digest, Jul. – Sep. 1967, p. 9.
[46] CHECO Report, "Rolling Thunder, July 1965 – December 1966," pp. vi-vii.

difficult to assess."[47] Under different circumstances, air commanders might have emphasized the speed with which bombing's results manifested themselves, but the reverse was true during Rolling Thunder. When conventional measurement techniques did not substantiate results analysts intuitively knew to be present, resorting to imprecisely defined cumulative effects was one way of exploiting the campaign's protracted duration.

Bomb damage measurement criteria reflected the lengthening time horizon air planners envisioned – especially in Rolling Thunder's later stages. Rolling Thunder Digest scarcely mentioned the word "attrition" prior to the October – December 1967 edition, which included a photograph labeled "Vehicle Attrition – Route 137" showing where aircraft had destroyed some large truck convoys. Previous editions had featured photos of airfields, railroad yards, power plants, and similar facilities. References to attrition became much more numerous in all three 1968 editions of the Digest where each "Operations Highlights" section included photos and narrative comments entitled "truck attrition," "vehicle attrition," and "waterborne logistic craft attrition." The comments emphasized familiar first order effectiveness statistics such as the numbers of vehicles sighted, attacked, damaged, and destroyed each month, but did not always claim second or third order results deriving from those statistics. Air commanders may have paid less attention to second order results during Rolling Thunder's final months; however, available evidence does not suggest that they focused exclusively on basic first order statistics.

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[47] Rolling Thunder Digest, Apr. – Jun. 1967, p. 7.

Readiness to accept a protracted war influenced bombing effectiveness measurement by making slow progress acceptable. Instant results were not demanded, which was comforting because there seemed no way to produce them anyway. Had a massive air attack been delivered in anticipation of prompt enemy capitulation, success or failure might soon have been more readily apparent. Without the requirement of dramatic progress toward an obvious victory, the generals could interpret any indication that bombing was even inconveniencing the enemy as a favorable omen. The seductive lure of the administration's graduated fixed target approvals may also have permitted air strategists to accept ambiguous effectiveness indicators as precursors of the more clear-cut signs of victory to be expected once bombing could proceed unhindered. The hope that their recommended bombing policy would eventually be approved might have helped account for the curious juxtaposition of vociferous complaints and upbeat assessments.

A few senior officers -- some of whom were retired and speaking after the campaign had ended -- did not fit the prevailing pattern of claiming Rolling Thunder was successful despite debilitating restrictions and the campaign's protracted duration. Former Marine Corps Commandant Gen. David Shoup, who had retired before Rolling Thunder began, was a bitter critic of the campaign. He wrote in 1969 that, "Much of the reporting on air action has consisted of misleading data or propaganda to serve Air Force and Navy purposes. In fact, it became increasingly apparent that the U.S. bombing effort in both North and South Vietnam has been one of the most wasteful and expensive hoaxes ever to

be put over on the American people."[48] Former 2nd AD commander General Moore was

less disillusioned than Shoup, but judged Rolling Thunder an overall failure because of

political restrictions. Moore thought air power had effectively destroyed the assigned

targets, but had not broken the enemy's will to fight because "the targets we were given to

hit were not the ones that were hurting the North Vietnamese."[49] Moore urged his Project

Corona Harvest interviewer in 1969 to document thoroughly the restraints imposed on

Rolling Thunder and predicted,

> Someday there's going to be a day of reckoning and there will be a lot of
> criticism that the Air Force didn't do the job. I've already heard it and I've
> read articles written on it: The air couldn't stop the resupply, and the air
> couldn't do this, and the air couldn't do that; that in spite of all the
> tremendous air effort put out, they just flooded South Vietnam with
> supplies and men. Well, I think it's extremely important that we made [sic]
> this a historical fact.[50]

Retired 2nd Air Division and Seventh AF Vice Commander General Meyers took a

different track by denying that any overall judgment about the campaign's effectiveness

was even possible. During a 1970 interview, he stated, "I don't think you can make an

honest evaluation of Air Force or airpower effectiveness ... in the Vietnam War because

we were operating under wraps for the entire part of the war; and you can't measure

effectiveness if you don't turn it loose and let it function, let it perform to its maximum

capability, and we certainly never approached anything like that in this war." Meyers was

content to let World War II bombing effectiveness stand on its own record because "we

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[48] Gen. David M. Shoup, "The New American Militarism," Atlantic Monthly, Apr. 1969, p. 55.

[49] Moore, OHI transcript, p. 68.

[50] Moore, OHI transcript, p. 73.

had complete latitude to employ it the way we wanted to."[51] The general did not explicitly say whether Rolling Thunder had succeeded or failed, but was plainly disappointed with its outcome as of 1970. Rather than saying the campaign had failed because of excessive political meddling, he wanted to declare the whole question of success or failure out of bounds. Perhaps Meyers' wanted to keep Rolling Thunder from becoming a referendum on the larger question of bombing's utility as a policy instrument because he viewed the campaign as a poor example of what airpower could achieve.

Other officers also contended that the campaign's results were not entirely knowable. Lieutenant Colonel John Rosenow, a MACV headquarters intel analyst, expressed a vague conviction that Rolling Thunder's final results were imponderable, yet somehow successful. Speaking only weeks after the campaign had ended, he observed, "I don't think that anybody has given sufficient thought as to how you're going to measure the effectiveness of airpower." He began by considering the bombing's objectives, raising the familiar question of whether the campaign was supposed to stop infiltration completely or merely impede it. Rosenow appeared unsure what the real objective had been, but thought, "If we were to slow it [infiltration] down perhaps we were damn successful and I think we were." He felt knowing only American objectives was not enough to permit valid effectiveness assessments. He believed definitive judgments depended on knowing "how well did air counter the military objectives of the enemy? ... you're going to have to go to the enemy to get a hell of a lot of this information of how effective airpower was."

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[51] Gen. Gilbert Meyers, OHI transcript, May 27, 1970, K239.0512-282, in USAF Collection, AFHRA, p. 197.

Depending on what enemy objectives had been, Rosenow thought bombing might be

judged effective if it had delayed the achievement of those objectives, postponed

campaigns, or restricted enemy activities to particular areas. He deemed such criteria the

proper yardsticks for measuring success and insisted, "You're not going to measure the

effectiveness of airpower by inaccurate body counts or by so many trucks knocked out."[52]

Rosenow's reasoning was sound from a theoretical standpoint, but comprehending the

mind of the enemy is incredibly difficult in practice. Any practical evaluation of overall

results during wartime seems unavoidably confined to monitoring observable enemy

responses and behaviors. After the war, as additional sources such as memoirs and secret

archival materials become available, more comprehensive assessments may become

possible.

The most distinguishing characteristic of senior officers' overall assessments was a

durable faith that somehow the campaign would succeed despite political obstacles that

assured a protracted war. Some individuals deviated from that view, but the passage of

time did little to undermine many officers' confidence in eventual victory.

Civilian administration officials' opinions about Rolling Thunder's overall

effectiveness developed along different lines than those of most military officials.

Evolution rather than continuity characterized their thinking. Secretary of Defense

McNamara initially shared the military's optimism that bombing would achieve American

goals. The generals' confidence in bombing's potential effectiveness persisted, but

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[52] Rosenow, OHI transcript, pp. 30-32.

McNamara developed increasing doubts as time passed. In mid-1965, he reported, "Even with hindsight, I believe the decision to bomb the DRV was wise and I believe the program should be continued."[53] Two years later, he was questioning bombing's effectiveness and his outlook had grown decidedly gloomy. By that time, the Secretary agreed, "There can be no question that the bombing campaign has and is hurting North Vietnam's warmaking capability," but he doubted any bombing campaign "short of one which had population as its target, would by itself force Ho Chi Minh's regime into submission."[54] Of course, the military commanders did not contend bombing could win single-handedly either. McNamara was by then expressing the pessimistic view that despite continuing adjustments in the air campaign, "no improvements and refinements can be expected to accomplish much more than to continue to put a high price tag on North Vietnam's continued aggression."[55] McNamara's comments were consistent with his belief that the war had to be won on the ground in the South rather than in the air over the North. Decades later, he remained convinced that "Airpower advocates in the air force and navy accepted bombing's effectiveness as dogma and failed to examine precisely what it could accomplish in particular situations."[56]

Other influential civilians such as former National Security Advisor McGeorge Bundy also switched to counseling restraint. Bundy had urged bombing escalation in 1965, but in early 1967, he wrote a letter to the President in which he said, "On the

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[53] McNamara's Rolling Thunder review, July 30, 1965, Pentagon Papers, IV.C.3, p. 139.
[54] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 277.
[55] Senate Preparedness Subcommittee, Part 4, Aug. 25, 1967, p. 278.
[56] Robert S. McNamara with Brian VanDenMark, In Retrospect: The Tragedy and Lessons of Vietnam,

ineffectiveness of the bombing as a means to end the war, I think the evidence is plain ...

Ho Chi Minh and his colleagues simply are not going to change their policy on the basis of

losses from the air in North Vietnam." However, Bundy opposed ending bombing

outright because to do so would "give the Communists something for nothing" and

encourage peace advocates to demand further unilateral concessions.[57] Bombing was

therefore ineffective, but needed to be continued anyway for lack of a better alternative.

A few government officials were not discouraged during Rolling Thunder's first

year when bombing did not appear likely to end the war quickly. Rather than urging the

earliest possible end to the war, an October 1965 State Department paper even discussed

deliberately prolonging the fighting until Hanoi had developed the proper state of mind for

negotiations. The paper's authors thought excessive bombing might force Hanoi to

choose either to obtain Soviet and Chinese aid or to commence negotiations before the

requisite degree of hopelessness about the prospects of victory had developed. According

to that idea, as long as the Hanoi leadership was hopeful, the regime would opt to escalate

the war with Communist Bloc aid rather than negotiate. Bombing therefore needed to be

modulated very carefully, because, "We may be able to recognize the optimum time for

exerting further pressure by increasing the level of our bombing, but an increase in our

bombing of the North at the present time may bring matters to a head too soon."[58] The

State Department did not unanimously advocate deliberately prolonging the war, but some

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(New York: Times Books, 1995), p. 153.

[57] Letter, M. Bundy to the President, Spring, 1967 (exact date uncertain), Pentagon Papers, IV.C.7.(b), vol. II, pp. 26-27. Walt Rostow replaced M. Bundy as Nat'l Security Advisor on Apr. 1, 1966, but Bundy remained as an outside advisor.

officials sought to apply bombing with the finesse required for victory on the most

auspicious terms. Victory through airpower might initially have seemed inevitable, but

bombing effectiveness was not dependent on quick results. By 1967 and 1968, those

State Department ideas would likely have sounded implausible to practically all

administration figures. Unlike the generals, the civilians progressively lost confidence in

bombing's efficacy as clear signs of success proved elusive.

Divergence between military and civilian bombing effectiveness views was a

prominent feature of Rolling Thunder. The military initially favored a severe campaign

designed to secure quick victory, but settled for a protracted war of attrition when

political leaders demanded a more gradual approach. Military officers complained about

bombing restrictions, but displayed a surprisingly durable optimism about the campaign's

ultimate prospects. Generalizations about civilian leaders' attitudes are harder to make

because officials held more diverse views than military commanders and were more prone

to change them as time passed. Most civilians were initially optimistic and expected

prompt success even from limited attacks. When bombing lasted more than a few months,

a few officials actually began favoring a protracted campaign and a methodical progression

towards a negotiated settlement that would avoid unwanted escalation or Sino-Soviet

intervention, but such attitudes were uncommon.

At least one analyst has said that characterizing Rolling Thunder as effective may

have created a vicious cycle within policy making circles. Morris J. Blachman, an Air

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Force intel officer in Vietnam, believed that bomb damage claims were exaggerated. If so, then the seemingly impressive damage statistics implied more enemy infiltration and stronger Communist Bloc support than may actually have existed since those countries were presumably sending more replacement equipment to make up for the items erroneously claimed destroyed.[59] Overestimating foreign support may have amplified existing Johnson Administration fears of Soviet or Chinese intervention if the U.S. intensified the war. The administration might have reacted to the illusory intervention threat by restricting bombing. If Blachman's thesis is correct, then claiming good first order effectiveness might have triggered administration responses that undermined the prospects for favorable second and third order results.

After a year or two with no end in sight, disillusionment pervaded the civilian leadership, gradually undermined faith in bombing's utility. Depending on an observer's point of view, the military either displayed an enduring sense of duty or else decided Rolling Thunder was not a very good bombing campaign, but was the only one available. Likewise, administration officials either wisely perceived bombing's ineffectiveness or else displayed fickleness and loss of nerve when faced with difficult policy choices.

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[59] Morris J. Blachman, "The Stupidity of Intelligence," in Charles Peters and Timothy J. Adams, eds., Inside the System, (New York: Praeger, 1970), p. 279.

CHAPTER 10 – INSTITUTIONAL DYNAMICS AND EFFECTIVENESS MEASUREMENT - ALTERNATIVE EXPLANATIONS

Military and civilian officials applied highly complex bombing assessment methods during Rolling Thunder. People ranging from aircrews and squadron intel officers to generals and senior Johnson Administration officials articulated creative views about how to recognize bombing's success or failure at achieving objectives. Assessments prepared by Air Force and other military agencies often had an optimistic tone, but the campaign's outcome proved disappointing. Why were those assessments so perennially optimistic and did they have any influence on the campaign's overall results?

In a narrow sense Rolling Thunder did achieve part of its objectives by increasing the price of North Vietnamese attacks and making infiltration difficult, but the magnitude of the results was insufficient to convince Hanoi to stop fighting in the South. Administration officials adapted their effectiveness assessments to match the campaign's chronic inability to produce expected results, but military officials showed few signs of changing their optimistic expectation that bombing would work well if given a proper chance. Even after the 1968 Tet Offensive, Admiral Sharp and others persisted in emphasizing the campaign's positive achievements and downplaying its disappointments. Pilots who flew the bombing missions often suspected the campaign was not working well, but were not in positions where they could fully grasp or articulate the problems.

Perhaps some identifiable factor interfered with the military's capacity to perceive and respond to Rolling Thunder's relative paucity of overall success.

Large government bureaucracies, including the USAF, conducted the air war, leading some observers to suggest that institutional factors such as command structures, route packages, interservice rivalry, and a phenomenon called goal displacement might shed light on the issue.[1] All four factors might have had some deleterious influence on the assessment process, but none is entirely persuasive, and explanations based on those factors tend to blame military organizations for whatever assessment shortcomings may have existed. The purpose of this work is not to apportion blame, but to explain why military (especially Air Force) officials were so reluctant to conclude that Rolling Thunder was not succeeding.

Command Structure and Route Packages

Defense Department analyst James Clay Thompson has suggested that a tangled military command structure that complicated overall direction of the bombing effort might have compromised overall campaign effectiveness in order to satisfy military bureaucratic needs. Thompson said both the Air Force and Navy wanted a divided command arrangement for Rolling Thunder because having one service in charge was mutually unacceptable. He concluded that if the operation had gone well under Air Force control,

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[1] James Clay Thompson, Rolling Thunder: Understanding Policy and Program Failure (Chapel Hill, NC: The Univ. of North Carolina Press, 1980) cited all four factors. John T. Smith, Rolling Thunder: The American Strategic Bombing Campaign Against North Vietnam, 1964 – 1968, (Walton on Thames, Surrey, England and St. Paul, MN: Air Research Publications, Phalanx Publishing, 1994), mentioned the

the Air Force would have gained political prestige over the Navy and *vice versa.*[2]

Thompson's contention raises the possibility that the command structure might also have corrupted bombing data collection and interpretation.

Rolling Thunder participants viewed split command arrangements and route packages as two sides of the same coin, but did not necessarily subscribe to Thompson's views. Command arrangements were indeed split along several lines. The primary divide was between Air Force and Navy organizations, but there were additional splits within the Air Force command structure. Seventh AF coordinated USAF operations while Carrier Task Force 77 (CTF-77) handled Navy operations. To further confuse matters, Seventh AF exercised operational control of USAF units while Thirteenth AF exercised administrative control of those same units. Two numbered Air Force headquarters exercised different types of authority over the same units, but only Seventh AF decided which approved targets would be struck and when.

The seven armed reconnaissance route packages into which North Vietnam was eventually apportioned among the services have come to symbolize Rolling Thunder's fragmented nature, but the arrangement had some logical basis. Practical considerations such as geography partially explained the layout. The route packages were not exclusive "turf" of the service given primary responsibility for them. With proper coordination, aircraft from either service could strike any authorized target in North Vietnam, but as already mentioned, proper Air Force – Navy coordination was sometimes too slow to

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first three factors.
[2] Thompson, p. 76.

permit shifting sorties to alternate targets. As Gen. Meyers explained, "the theoretical

agreement was that we could do this [coordinate to strike Navy targets], but as a practical

matter, it wasn't done very often because of lack of communications. Time didn't permit

it."[3] Even in the absence of such coordination, coastal parts of any route package

sometimes became *de facto* Navy zones while inland areas closer to air bases in Thailand

fell under Air Force purview.

Divided command structures and route packages might have influenced bombing

effectiveness assessment. Air Force and Navy commanders exercised nearly independent

control of routine armed reconnaissance missions against transportation routes.

Commanders might receive approval to strike certain fixed targets at their discretion, but

Alpha strikes against highly sensitive RTTL targets - especially near Hanoi or Haiphong -

were separate from the route package arrangement and were under centralized White

House or Pentagon control. Route packages might conceivably have obscured overall

bombing results if Air Force and Navy air commanders had focused on their own

territories without understanding how bombing affected the enemy as a whole. The

service having primary responsibility for a route package was also primarily responsible

for judging its own bombing results and sharing that information with the other service

and with Admiral Sharp' PACOM headquarters. Major General Gordon Blood, Seventh

AF Deputy Chief of Staff for Operations, noted that Air Force and Navy units both

received their fixed target authorizations through PACOM, but Seventh AF and CTF-77

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[3] Gen. Gilbert Meyers, OHI transcript, May 27, 1970, K239.0512-282, in USAF Collection, AFHRA, p. 87.

did not systematically share reports about each other's bombing results. Blood explained,

"their [Navy] reports went back to PACOM. Our [Air Force] reports stayed down in

Saigon [Seventh AF Headquarters]. So we were completely split as far as knowing what

was going on in each other's area."[4]

Any bombing assessment problems attributable to the command structure did not

seem significant to either the Air Force Chief of Staff or CINCPAC. In 1970, Gen.

McConnell said, "I don't see anything actually wrong with the command arrangements as

they finally came out under the circumstances that the war's being conducted over there."[5]

Admiral Sharp told the Senate in 1967 that the Rolling Thunder command arrangement

was "working beautifully," and "I would not change anything about it for the war."[6]

Route packages may have appeared symptomatic of divided command structures, but

Sharp insisted they improved his ability to supervise bombing conducted by carrier task

forces at sea and Air Force units in Thailand and South Vietnam. Every edition of

PACOM's quarterly Rolling Thunder Digest stated, "To insure [sic] economical and

effective use of resources, operational procedures have been developed by the operating

units, 7th Air Force (7AF) and Carrier Task Force 77 (CTF-77), that permit the full range

of coordination for all air operations in the Rolling Thunder program and yet permit both

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[4] Maj. Gen. Gordon F. Blood, OHI transcript, Apr. 6, 1970, K239.0512-257, in USAF Collection, AFHRA, p. 37.
[5] Gen. John P. McConnell, OHI transcript, Nov. 4, 1970, K239.0512-371, in USAF Collection, AFHRA, p. 2.
[6] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 1, Aug. 10, 1967, p. 103. (Cited hereafter as "Senate Preparedness Subcommittee.")

services to operate in all areas."[7] Those "operational procedures" featured the route

packages, which <u>Rolling Thunder Digest</u> claimed actually facilitated bombing assessment

because, "We have found that supervision and control of strike operations can be

improved, and results can be analyzed more realistically if targets are identified and

interrelated in target groupings that are geographically associated."[8] The term

"geographically associated" presumably meant divided into route packages. Even after

Rolling Thunder had ended, Sharp still thought the route package system was "sort of an

operational necessity. It was more than a convenience, it was a pretty important thing."[9]

The CINCPAC <u>Rolling Thunder Digest</u> reports also claimed that route packages

strengthened interservice cooperation and described some examples of good Air Force –

Navy coordination. One example occurred in November 1966 when Seventh AF planes

found and attacked a large truck convoy in Route Package 1, a USAF area of

responsibility. The Air Force relayed the news to CTF-77, which dispatched carrier planes

to follow up the attack within an hour, destroying additional trucks. Attacks continued

into the night. Two similar examples of good Air Force – Navy teamwork happened

during the next few days. The report concluded, "Close coordination as demonstrated

above results in the optimum use of air power in SEA [Southeast Asia]."[10]

Other air commanders were less persuaded that route packages were a good

arrangement. Pacific Air Forces commanders General Harris and General Ryan (who

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[7] Headquarters PACOM, Operations Division, <u>Rolling Thunder Digest</u>, all editions, p. 2.
[8] <u>Rolling Thunder Digest</u>, Jul.- Sep. 1966, p. 16.
[9] Adm. U. S. G. Sharp, OHI transcript, Feb. 19, 1971, K239.0512-409, in USAF Collection, AFHRA, p. 13.

succeeded Harris in February 1967) were Admiral Sharp's air component commanders.

When interviewed in 1971, both generals seemed satisfied with command arrangements,

but Harris criticized the route packages. Harris said, "I didn't feel any serious objection or

frustration on those command arrangements," but he deemed route packages "a hell of a

poor way to run a railroad" because they reduced operational flexibility and "affected the

capabilities of both the Fleet units and the ground-based Air Force units to carry out a

more effective campaign."[11] During his interview, Ryan agreed the command

arrangements were "rather complicated," but insisted, "the command arrangements did not

interfere with the prosecution of the war at all." Furthermore, he added, "I know of no

major problem that the division among the Route Packs caused."[12] General John W.

Vogt, PACAF Deputy Commander for Plans and Operations from mid-1965 to mid-1968,

agreed more closely with Ryan than with Harris. Vogt acknowledged in a 1978 interview

that "the Route Packs were picked for the convenience of the fleet, primarily," and that

designating a single air commander "probably would have been the better way" to control

Rolling Thunder, but he still thought the route packages were helpful because they

obviated "a great deal of detailed coordination" between services. He felt "You wouldn't

have been able to operate" without route packages because the required degree of

coordination would have been difficult to achieve.[13]

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[10] Rolling Thunder Digest, Oct. – Dec. 1966, pp. 16-17.

[11] Gen. Hunter Harris, OHI transcript, Apr. 22, 1971, K239.0512-403, in USAF Collection, AFHRA, pp. 10 and 27-28.

[12] Gen. John D. Ryan, OHI transcript, May 20, 1971, K239.0612-476, in USAF Collection, AFHRA, pp. 5 and 8.

[13] Gen. John. W. Vogt, OHI transcript, Aug. 8-9, 1978, K239.0512-1093, in USAF Collection, AFHRA,

Seventh Air Force officials were closer to the action and were considerably more dubious about route packages than their PACOM and PACAF superiors. Seventh AF Commander Gen. Momyer later said, "Dividing North Vietnam into route packages compartmentalized our airpower and reduced its capabilities. ... The route package system was fundamentally wrong for the best application of all U.S. airpower. ... was a compromise approach to a tough command and control decision, an approach which, however understandable, inevitably prevented a unified, concentrated air effort."[14] Lieutenant Colonel David Blackbird, a Seventh AF planning officer, said the route packages did not correspond to the way the enemy divided his own territory, yet the packages "tended to drive our thinking, with respect to the enemy's behavior in so far as it did influence our thinking about an area like Route Package I or Route Package II as an entity, we sometimes took what resulted in a distorted view of what kind of targets should be struck and what their priority should be and exactly how we should go about that."[15]

The possibility remains that James Clay Thompson was right and the services were satisfied with the command structure for reasons other than prosecuting the air war most effectively. The command structure and route packages certainly influenced the way operations were controlled, but their bombing assessment consequences were less dramatic. The leading consequence was probably the fragmentation of assessment efforts between Air Force and Navy channels to which Gen. Blood alluded. Seventh AF would

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pp. 120-122.
[14] Gen. William W. Momyer, Air Power in Three Wars, (Washington, D.C.: Department of the Air Force, 1978), p. 95.
[15] Lt. Col. David P. Blackbird, OHI transcript, Nov. 6, 1969, K239.0512-302, in USAF Collection,

have felt that institutional split keenly, but integrating Air Force and Navy BDA and intelligence data at the PACOM level should have been enough to bridge the gap.

Interservice Rivalry

Rolling Thunder's command arrangements might have reflected underlying discord between military services, so perhaps interservice rivalry can help explain the air commanders' tolerance for divided control of air operations. Some observers have argued that such rivalries might also have distorted bombing effectiveness measurement for parochial reasons, producing a gap between expected and actual results. Defense Department analyst James Clay Thompson thought, "Interservice rivalry also influenced the measurement of the effectiveness of the strategic air campaign." He saw competition between the Navy and Air Force as part of an ongoing bureaucratic struggle whereby, "The interservice rivalry created competition between the navy and the air force, each of which tried to fly more sorties or drop more bombs than the other and thus to dominate the strategic air mission."[16] Retired Marine Corps Commandant General David Shoup stated that "by early 1965 the Navy carrier people and the Air Force initiated a contest of comparative strikes, sorties, tonnage dropped, 'Killed by Air' claims, and target grabbing which continued up to the 1968 bombing pause."[17] Under such competitive conditions, the Air Force and Navy might have exaggerated rather than underestimated their bombing effectiveness as each service tried to outperform the other.

AFHRA, pp 2-3.
[16] Thompson, pp. 80-81.

Some intelligence officers thought Air Force – Navy rivalry promoted exaggerated bombing results reporting, but Morris Blachman discounted the possibility of an organized effort to generate misleading results, maintaining "there was no conscious conspiracy to inflate the numbers of trucks and bridges that supposedly had been destroyed by American bombs." Instead, he attributed measurement problems to rivalry between the services, each of which competed to show it could bomb most effectively and to "the system of rewards and punishments inherent in the [Air Force] promotion pattern." The competition supposedly biased BDA reporting, prompting Blachman to lament, "I know of no Air Force officer who thought he would score brownie points by devising an intelligence system that would have reported less destruction from the bombing of the North."[18]

Geographic separation might have minimized overt displays of rivalry between Air Force and Navy aircrews, but personnel exchanges sometimes highlighted frictions. The Air Force periodically sent liaison pilots to aircraft carriers operating in the Gulf of Tonkin. When each liaison officer prepared an end-of-tour report after his several weeks at sea, evidence of disagreement about how to measure bombing effectiveness occasionally emerged. Lieutenant Colonel William L. Craig served aboard a carrier from March 1-29, 1966 and in a report stamped "Air Force Eyes Only" he complained about efforts to twist bombing statistics to the Navy's advantage. He began by pointing out how "Aircraft carrier configurations pose aircraft size and weight restrictions which influence all Navy thinking, positions, and actions." Specifically, carrier-based planes carried lighter

[17] Gen. David M. Shoup, "The New American Militarism," Atlantic Monthly, Apr. 1969, p. 55
[18] Morris J. Blachman, "The Stupidity of Intelligence," in Charles Peters and Timothy J. Adams, eds.,

fuel and ordnance loads than USAF land-based planes, so the Navy tried to manipulate

bombing statistics accordingly. Craig said, "The Navy will emphasize short, quick sorties

in the daytime" and "will advertise its numbers of missions against many targets." The

Navy would count sorties and quantities of ordnance expended, but "Ton[s of ordnance]

per sortie rate will be hidden since it will remain at something less than .9."[19]

Craig deemed inadequate armed reconnaissance a Navy weakness that could

adversely affect Air Force political and institutional interests. He pointed out that, unlike

quick strikes against fixed targets near the coast, properly conducted armed

reconnaissance sorties lasted longer, requiring heavier fuel and ordnance loads than carrier

planes could accommodate. Navy planes could not carry many flares for night

reconnaissance so "Armed reconnaissance especially at night will be de-emphasized." He

added, "While lip service will be given to armed reconnaissance these missions will be

nothing more than quick, short sweeps, usually along the coast of NVN." Due to the

cursory missions, "Time and area gaps will appear within the Navy's armed

reconnaissance program, especially at night. These will cause the Air Force major

problems later, i.e., truck traffic will move quickly across the flatlands of NVN during the

gaps and reach the mountainous, heavily wooded terrain of Laos. Once there, the traffic

will be hard for the Air Force to dig out." Unfortunately for the USAF,

> Laymen in Congress and elsewhere will not detect the end result of the
> Navy's de-emphasis of armed reconnaissance, especially their night effort.

Inside the System, (New York: Praeger, 1970), pp. 272, 275, and 276.
[19] Lt. Col. William L. Craig, End-of-Tour Report, Apr. 1966, K143.5072-96, in USAF Collection, AFHRA. (Page numbers are omitted because the report is in two sections and numbering restarts in the second part.)

But the Air Force will live with it and be criticized for not stopping the traffic. We shall soon see an even more aggressive Navy information program emphasizing the number of targets struck and specific results when good. The large number of missions, sorties, and types of weapons will be thrown in. Weekly and monthly summaries will probably mention tonnage. And once again it will appear to the public that the Navy is the force truly carrying the war to the real enemy.[20]

Craig also thought, "By increasing their sortie rates in the above manner, they will, as a result, increase their monthly tonnage rate, even though their ton per sortie rate will remain the same or less (.9 tons per sortie)."[21]

Lieutenant Colonel Craig believed the longer-term implications of the Navy's alleged bombing effectiveness obfuscations were even more ominous for the Air Force because, "As we look into the future, considering DOD [Department of Defense] desires for greater consolidation and standardization, the Navy's size and weight constraints will continue to influence Air Force aircraft requirements and development unless preventive actions are taken." The correctives he suggested included advertising the Air Force's abilities to "Carry large payloads with all aircraft, [thereby] improving the cost effectiveness of each sortie," fly longer distances, and stay longer within target areas compared to the Navy. The Air Force would also need to "educate laymen" about Navy limitations to prevent adverse influences on future Air Force aircraft designs.[22] Evidently, institutional priorities had some influence on how USAF officers interpreted bombing results.

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[20] Craig, End-of-Tour Report.
[21] Craig, End-of-Tour Report.
[22] Craig, End-of-Tour Report.

Rolling Thunder participants who discussed interservice rivalry tended to distinguish between the relatively congenial relations at the flying unit level and the less cordial relations between top commanders. Craig did not mention the rapport between Air Force and Navy aircrews, but Col. Broughton explicitly claimed that rivalry was largely confined to the high command level. Broughton lauded a cooperative attitude between Air Force and Navy flying units. He recounted how his F-105 wing in Thailand had "a good exchange visit program going with our navy buddies" whereby a Navy plane periodically shuttled aircraft carrier pilots to the Air Force base and Air Force pilots to the carrier for visits. Broughton noted, "The navy guys and my guys had long since agreed that neither of us had a corner on all the good tactical smarts or how a crazy war like this one should be fought. There was no friction at the operating level." He acknowledged interservice tensions existed, but blamed senior officers. He remarked that when Air Force and Navy flyers "got together on the ground we always laughed at the big gears up the line arguing about who dropped the most bombs or flew the most sorties." During a bad weather period when the Navy's all-weather A-6 bombers were "flying missions and getting all the publicity back in the States, while the [Air Force F-]105s were all sitting on the ground," Broughton claimed Seventh AF headquarters fragged a strike mission despite the weather just to get publicity.[23]

Some 2nd AD and Seventh AF commanders and vice commanders during Rolling Thunder did acknowledge they competed with the Navy much as Broughton had

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[23] Col. Jack Broughton, Going Downtown: The War Against Hanoi and Washington, (New York: Orion Books, 1988), pp. 110, 111, and 118.

suggested. General Moore, commander until July 1966, echoed Lt. Col. Craig's

sentiments about how the Navy flew cursory sorties along the coast to inflate their sortie

count. During a 1969 interview, Moore said,

> Now this is for USAF eyes only, and ears: … Putting it bluntly, it was a
> competition between the US Navy providing tactical air on the scale that
> the US Air Force could do. And, to enable them to cycle those sorties on
> and off the carriers fast as they could do it, to generate the number per day
> that they needed to compete, they couldn't go inland. They had to get in,
> drop their bombs, and get back in time to get on the deck in time to not
> interfere with the next plane taking off.[24]

When he was Vice Commander of 2nd Air Division and Seventh AF, Gen. Meyers

worried about whether his crews would be able to strike the new targets the

administration released during each Rolling Thunder cycle. Chapter 5 described his "use-

them-or-lose-them" sortie attitude and his belief that he would not get any new targets

until he destroyed the previous ones. Competition with the Navy compounded Meyers'

troubles. During one period, the Navy and Air Force were each receiving a quota of three

new targets every two weeks. Meyers later said, "we would have been in a hell of a

position if the Navy got their three targets and we didn't get ours in the same time period.

So this puts additional pressure on you to get them and – let's be honest about it – we

kept getting telephone calls all the time saying, 'Hey, the navy got their targets. Why

haven't you got yours?'"[25]

Interservice rivalry obviously existed to some degree during Rolling Thunder, but

the phenomenon was neither unique to that campaign nor did it necessarily distort

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[24] Lt. Gen. Joseph H. Moore, OHI transcript, Nov. 22, 1969, K239.0512- 241, in USAF Collection, AFHRA, p. 18.

effectiveness assessments. Competition can be healthy, but Air Force - Navy rivalry

would have been counterproductive if it had garbled bomb damage reporting. However,

strife did not characterize all relations between senior officers from different services.

Considerable cooperation prevailed - at least in public - as the service chiefs closed ranks

to oppose Johnson Administration policy. None of the service chiefs or other

commanders who testified before the Stennis Committee in 1967 made disparaging

remarks about the other services or exhibited any other overt signs of interservice rivalry.

All the chiefs of staff agreed bombing was essential and insisted the best way to maximize

its success was to let the military bomb with minimal political restraints. During a 1969

interview, USAF Chief of Staff Gen. John McConnell described cooperation between the

services during Rolling Thunder by stating, "Well, there was to begin with, service

rivalries and things of that nature were, of course, all involved in it. Everybody wanted to

show up that he could do better than anyone else. But that didn't last very long. It

gradually subsided and pretty soon there was no problem at all, no problem at all, either

about the control of the missions or about the selection of targets or anything else. It all

worked fine."[26]

Goal Displacement

In his 1980 book, Rolling Thunder: Understanding Policy and Program Failure,

James Clay Thompson proposed that an unwholesome interaction between political

[25] Meyers, OHI transcript, p. 80.
[26] Gen. John P. McConnell, OHI transcript, Aug. 28, 1969, K239.0512-1190, in USAF Collection,

constraints and interservice rivalry might have distorted bombing assessment. He

theorized that stringent political constraints deprived military leaders of the desired

amount of control over operations. Thompson thought that commanders, frustrated by

targeting restrictions, yet pressured to produce results, began to express effectiveness in

terms of the variables they could control, particularly sortie counts and bomb tonnages.

Sorties and tonnages are only steps to achieving the larger end of destroying targets in a

way that contributes to political ends, but Thompson thought sorties and tonnages

displaced the larger goal. More sorties and bombs came to mean more effectiveness

regardless of the military results produced. Thompson used the term "goal displacement"

to describe this process whereby "the means to an end (goal) become the ends

themselves." He argued using sortie counts and bomb tonnages as effectiveness measures

had the effect of "orientating operational activity to the indicator that had been designed to

measure attainment of objectives. Goal displacement influenced operations, as each

service sought to fly more sorties and drop more tons of bombs than the other service."[27]

Goal displacement could disrupt air strategy by short-circuiting the proper

connection between effectiveness indicators and objectives. Assessment requires

continuity between first, second, and third order effectiveness indicators as well as

between indicators and objectives. Strategists need to answer several questions in order

to know how best to apply air power. First, what results should the bombing achieve?

Second, which strategy would best achieve those results? Third, which observable

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AFHRA, p. 22.
[27] Thompson, pp. 81 and 92.

indicators would most reliably reveal whether or not the strategy was on track to achieving the objectives?

If indicators became objectives, goal displacement occurred; however, Thompson's argument requires air commanders to have done more than confuse effectiveness indicators with objectives. Thompson treated sorties and tonnages as if they were, to use the terminology of the current study, first order bombing effects; however, neither sortie counts nor bomb tonnages are effectiveness indicators at all, but merely depict the amount of effort exerted. If Thompson were correct, air commanders not only overlooked second and third order criteria, but also looked at grossly inappropriate parameters when trying to assess bombing. Commanders actually had a better sense of which parameters were relevant to effectiveness than Thompson suspected.

Civilian strategists and generals sometimes confused ends and means, but not necessarily in ways consistent with goal displacement. The Johnson Administration may have mistaken political signaling for waging war. Perhaps conducting a bombing campaign, restricting numbers of targets, avoiding civilian casualties, and starting negotiations became ends unto themselves rather than indications of progress towards achieving third order success. The generals showed a different confusion of ends and means by remaining remarkably optimistic about bombing's overall prospects despite their grave misgivings about many specific aspects of the campaign. They were somehow able to overlook unfavorable second and third order indicators and find reasons to hold favorable overall outlooks, but Thompson's goal displacement concept does not explain how generals skipped over troubling effectiveness indicators to conclude the campaign

would somehow turn out well. The generals' behavior might better be described as

unfounded optimism.

The possibility exists that goal displacement was more prevalent at lower levels of

command than among senior officers. Flying unit personnel saw the war from a narrower

perspective than senior officers did. Could a field unit's fixation on flying sorties,

dropping bombs, and destroying targets have inculcated its personnel with a belief that

performing those activities was bombing's ultimate purpose?

Lieutenant Barry Watts related an anecdotal example of behavior that seems

consistent with goal displacement. After Lt. Watts left Vietnam, his F-4 unit intensified its

night interdiction effort and destroyed numerous trucks until Seventh AF headquarters

ended the operation after the truck kill rate in Mu Gia Pass tapered off. Watts lamented,

"The reality, of course, was that the BDA dropped off precisely because nothing much

was moving through the pass any longer - which was the whole point - and by terminating

the joint operation ... we simply allowed the North Vietnamese to begin using the artery

again."[28] If Watts' analysis were correct, truck kill rates originally considered merely a

first order sign of progress became an end unto themselves while Seventh AF lost sight of

the second order objective of interdicting truck traffic. Decreasing truck kills may thus

have transmogrified from a sign of success into a sign of failure. The previous discussion

of Seventh AF bombing assessment methods and criteria suggests that the headquarters

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[28] Barry D. Watts, "Unreported History and Unit Effectiveness," Journal of Strategic Studies, vol. 12, Mar. 1989, p. 98.

was far from perfect, but was probably shrewd enough to avoid making the fundamental blunder Watts suggested it made.

Although Thompson did not list MiG kill statistics as examples of goal displacement, the interest all levels of command showed in comparing MiG kills to U.S. aircraft losses was another activity that seemed to exhibit some goal displacement traits. Commanders were not allowed to bomb most key MiG air bases until 1967, but they were certainly pressured to produce bombing results. Aerial battles with MiGs seemed much more exciting than the more mundane bombing duties and were the one case where American and North Vietnamese air forces met on relatively symmetrical terms. Unlike duels against SAMs or AAA, aerial battles seemed to allow a direct comparison of aerial fighting prowess. Of course, shooting down MiGs was incidental to the bombing campaign, but Air Force commanders at least had some control over air-to-air fighting. So did the USAF allow aerial victories to become ends unto themselves, displacing the more abstract, less controllable bombing effectiveness indicators? The idea seems overdrawn. Aerial victories have had a romantic aura since World War I. World War II bomber crews stenciled symbols on their planes to advertise the number of enemy fighters they had shot down. If tracking MiG kills during Rolling Thunder was a goal displacement symptom, then the problem must be nearly universal.

Thompson was not the first to propose that some sort of confusion between ends and means had distorted Rolling Thunder assessment. A 1972 study by scholars from the Cornell University Program on Peace Studies offered a similar analysis in their scathing indictment of the air war in Southeast Asia. Raphael Littauer and Norman Uphoff were

the study's primary authors. Without using the term "goal displacement," they postulated

that bombing participants used "professionalism" as a way of

> concentrating on the technical aspects of the mission, substituting a formal
> set of immediate objectives for the actual, long-term aims of the conflict. It
> often encourages competition on these formal grounds: which group,
> which service, flies the greatest number of sorties, which delivers most
> ordnance 'on target'? Competition also arises at the top of the chain of
> command, where a good showing must be made at appropriations hearings:
> furtherance of the overall aims of the war cannot be readily quantified, so
> the performance record of each service comes to depend on such criteria as
> the aircraft utilization ratio—the number of sorties flown per aircraft
> deployed, with the real results of those sorties left out of consideration.[29]

A pernicious blend of goal displacement and interservice rivalry was the central

component of Littauer and Uphoff's thesis. Evidence shows the USAF did compete with

the Navy in sorties and bomb tonnages. However, military personnel devoted far more

effort to ascertaining mission results than they did to counting sorties or bomb tonnages.

Assessment methods and criteria contained some conceptual irregularities, but were of a

high order of sophistication. Littauer and Uphoff wrote a strongly polemical anti-war

report at a time when only limited information about Rolling Thunder had been

declassified, so the overall validity of their assessment is questionable. The reader must

therefore view their findings with caution.

Some evidence supports the existence of goal displacement or the related

phenomenon described by Littauer and Uphoff, but more information contradicts both

notions. The most obvious evidence was that the USAF hardly ever used sorties, bomb

tonnages, or aircraft utilization rates to measure success. Commanders repeatedly

asserted that the number of sorties available was adequate, but directed against the wrong targets. They did not offer bomb tonnage figures as evidence of effectiveness other than to argue that the bombs were, like the sorties that carried them, usually available in ample quantities, but being applied to the wrong targets. Aircraft utilization rates were standard planning factors related to sortie rate calculations, but the author knows of no case where anyone used them to measure bombing effectiveness. Contrary to assertions made by Thompson or Littauer and Uphoff, available evidence shows that neither flying units nor senior commanders used sortie counts, bomb tonnages, or aircraft utilization rates as surrogates for Rolling Thunder's military objectives.

Goal displacement is at best a very fragmentary explanation for the campaign's failure. Rolling Thunder was one of history's most carefully measured air operations, featuring sophisticated analytical techniques to chart progress. Most military participants – even the lowest ranking aircrew members – had a basic understanding of how to recognize bombing's success or failure. Flying units emphasized variables they could control because their jobs required executing an air strategy rather than formulating one. People ranging from aircrews to senior officers complained that the ways they were ordered to conduct the campaign reduced bombing effectiveness, but they do not seem to have fallen victim to goal displacement.

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[29] Raphael Littauer and Norman Uphoff, eds., The Air War in Indochina, (Boston: Beacon, 1972), pp. 28-29.

An Air Force Bombing Paradigm

When he wrote <u>The Structure of Scientific Revolutions</u>, Thomas Kuhn was not thinking about military theory, but his ideas about paradigms guiding the way groups of people think have gained wide circulation. Kuhn defined scientific paradigms as "universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners,"[30] and gave Newtonian physics and Copernican astronomy as examples. If paradigms also guide military thinking, then perhaps they can help explain how air commanders conceptualized the proper ways to measure Rolling Thunder's effectiveness.

Military air commanders are not scientists, but some of Kuhn's key points are applicable to military thought. In a modification of Kuhn's parlance, one could say that previous wars, especially World War II, were universally recognized military achievements that served as models demonstrating that bombing was a viable solution to some of the military problems posed by modern warfare and that Air Force professionals constituted a "community of practitioners."

Kuhn's ideas need adjustment to adapt them to the military context. In place of scientific theories, the USAF had air power theory and doctrine. The theory and doctrine that emerged from World War II held that strategic bombing of an enemy nation's vital centers, supplemented by ancillary air power roles such as aerial interdiction and close air support, was a potent method of winning wars. Successful bombing would be measured

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[30] Thomas S. Kuhn, <u>The Structure of Scientific Revolutions</u>, 2nd ed., (Chicago: The Univ. of Chicago Press), 1970, p. viii.

in a first order sense by physical destruction of enemy military forces, transportation

infrastructure, and industrial plants. Second order signs of success would include

economic disruption and military paralysis as bombing disorganized the enemy nation's

internal functions. Third order indicators of success might include a sense of hopelessness

among the enemy population and leadership, but the doctrine emphasized undermining

physical ability to wage war rather than breaking enemy morale. Among air power

practitioners, the most zealous ones believed that bombing could win wars independently

of land or sea forces (especially if nuclear bombs were used), but others granted the Army

and Navy a larger role. Strategic bombing theory and doctrine were the paradigm Air

Force members used when devising air power strategies to solve specific military

problems, and they were confident of their paradigm's viability.

For many Rolling Thunder leaders, the air power paradigm was based on World

War II because many of them had fought during that war and the war had been a clear

victory. They often used World War II analogies when discussing Rolling Thunder.

General Meyers' remark that "This port [Haiphong] represents to North Vietnam what the

industrial capacity of Germany and Japan represented to them during the World War II

time period"[31] was only one among many examples of such analogies. They had also

made wartime sacrifices that may have left lasting impressions on their attitudes. General

Ryan had lost a finger during a World War II bombing mission, an event of which he was

reminded every time he looked at his hands. World War I was a less persuasive paradigm

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[31] Senate Preparedness Subcommittee, Part 5, Aug. 28, 1967, p. 475.

both because it predated the practitioners' careers and because the aircraft technology available then was so rudimentary. Many Rolling Thunder aircrew and commanders were also veterans of the Korean War and drew analogies from that experience, but Korea seemed to them more an aberration than a model problem or solution. World War II filled the need for a successful example of what relatively unfettered strategic bombing could achieve, and served as a model for developing solutions to other problems.

Based on their professional experience, Air Force leaders during Rolling Thunder believed bombing was a quick and efficient way to achieve military objectives and doubted the Johnson Administration's unproven graduated bombing policy was a valid model for solving strategic problems. Graduated bombing seemed an abnormal short circuiting of Air Force doctrine because the policy aimed directly at third order results such as convincing the enemy to negotiate without having established the necessary foundation of first and second order destruction, disruption, and paralysis. Chief of Staff Gen. McConnell's remark that "I don't think Mr. McNamara understood air power or its application very well. ... In fact, I don't think that there was at that time anybody in the Office of the Secretary of Defense who understood the application of tactical and strategic air power. At least, not the way I understood it,"[32] suggested McConnell regarded McNamara as an uninitiated interloper who failed to appreciate the air power paradigm.

McConnell's comment also hinted that rational analysis of past wars was not the only reason why Air Force leaders adhered to their existing doctrine and ways of judging

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[32] McConnell, OHI transcript, Aug. 28, 1969, p. 39.

bombing effectiveness. Kuhn explained how new paradigms gain support if they "appeal to the individual's sense of the appropriate or the aesthetic – the new theory is said to be 'neater,' 'more suitable,' or 'simpler' than the old."[33] Bombing in the World War II style seemed neater, more suitable, and simpler than the Johnson Administration's bombing ideas. Commanders acquiesced in administration strategy, but engaged in passive resistance to it.

Other theoretical factors contributed to the Air Force's resistance to graduated bombing. Kuhn thought that when practitioners encounter anomalous situations, they first try to explain them in terms of the prevailing paradigm. A crisis can develop when the old paradigm proves unable to solve new problems, but Kuhn thought that communities of practitioners would not easily relinquish existing paradigms because "once it has achieved the status of paradigm, a scientific theory is declared invalid only if an alternate candidate is available to take its place." He pointed out that practitioners who do switch to a new paradigm must "have faith that the new paradigm will succeed with the many large problems that confront it, knowing only that the older paradigm has failed with a few. A decision of this kind can only be made on faith." Such a paradigm switch constitutes a scientific revolution. He extended his analysis to encompass political revolutions, but not drastic changes in military worldviews.[34]

Rolling Thunder seemed strange or even perverse to USAF professionals, but the campaign did not meet Kuhn's definition of an anomaly capable of challenging an

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[33] Kuhn, p. 155.
[34] Kuhn, pp. 77, 158, and 92-93.

established paradigm. When air leaders analyzed the campaign's mediocre results by applying their standard bombing paradigm, the results did not seem anomalous to them, but seemed perfectly consistent with the accepted idea that strategic bombing would be an effective way to win a war provided the doctrine were applied properly instead of being artificially restricted by inept political leaders. The existing paradigm neither broke down under stress from anomalous events nor did anyone propose an alternative the community of practitioners deemed viable. The existing paradigm derived from World War II clearly demanded a nearly unrestricted and overwhelming bombing campaign. The Johnson Administration's refusal to sanction such strong measures prompted air power practitioners to deny Rolling Thunder was a valid test of their paradigm.

General Meyers' exemplified that attitude when he said in 1970, "I don't think you can make an honest evaluation of Air Force or airpower effectiveness … in the Vietnam War because we were operating under wraps for the entire part of the war; and you can't measure effectiveness if you don't turn it loose and let it function, let it perform to its maximum capability, and we certainly never approached anything like that in this war."[35] Meyers was, however, perfectly willing to sanction evaluations of World War II air power effectiveness because air power had been given a rather free rein during that war.

Kuhn's paradigm concept does not fully explain Air Force bombing assessment criteria and methods used during Rolling Thunder, but his ideas have some explanatory value. When viewed in Kunhian terms, USAF leaders appear no more unreasonable or

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[35] Meyers, OHI transcript, p. 197.

stubborn than research scientists who are dedicated to an unbiased search for the truth.

Compared to the other alternatives explanations discussed here – command structure,

route packages, interservice rivalry, and goal displacement – the paradigm concept is the

most satisfying even if it is only a partial answer.

CHAPTER 11 - CONCLUSION

Rolling Thunder bombing assessment was a contentious process that engendered disputes between different military command levels and between military and civilian leaders. The U.S. Air Force played a prominent assessment role, but was only one among many participants in the process. Air Force flying units and headquarters staffs used different assessment methods and criteria, but agreed about downplaying parameters such as bomb tonnages dropped, numbers of sorties flown, and enemy personnel killed. Flying units emphasized specific types of quantifiable first order data such as numbers of trucks damaged and supply areas destroyed. They relied on headquarters for broader interpretations of the campaign's results, but were often skeptical about the ways headquarters ordered them to conduct the campaign and report events. Flying unit members were often frustrated when headquarters seemed unresponsive to requests for recce photos and other feedback the units desired. Headquarters organizations performed extensive analyses of second and third order results. Each successive staff from Seventh AF to the JCS produced reports, but their assessment methods did not differ fundamentally from one level to the next. For example, PACAF intel officers might have dismissed Seventh AF LOC activity analyses as "bean counting," but PACAF performed similar studies, and the perceived difference in analytical quality may have reflected normal pride in one's own organization as much as any true difference.

Deeper disagreements about defining and recognizing effective bombing divided

Air Force (and other military) members from Johnson Administration officials – most

notably Secretary of Defense McNamara. Military leaders saw bombing as a means to

build first and second order results as a basis for third order success, but administration

leaders behaved as if simply performing a bombing campaign might precipitate third order

success. With few exceptions, military personnel remained firmly convinced even after the

campaign had ended that unrestricted bombing was an exceptionally potent coercive tool

able to destroy enemy facilities and achieve operational results such as interdiction,

thereby setting the stage for attaining political goals. Civilian officials such as McNamara

initially believed bombing could achieve those third order political results more directly

without building upon the extensive destruction attending first and second order effects,

but lost faith in bombing's effectiveness as the campaign continued.

Senior military leaders understood air power application within a World War II

paradigm where massive destruction was acceptable. They were cognizant of bombing's

limitations and knew how to measure its effectiveness - at least in theory. Their Rolling

Thunder recommendations were based upon existing doctrinal precepts and featured

heavy bombing applied quickly and relentlessly to every military target until the enemy

surrendered.

When the Johnson Administration rejected military recommendations and chose

instead a restrained, gradually escalating campaign, air leaders adhered to their doctrine

and remained confident victory would come as the restraints were lifted. Bombing was

tightly restricted at first, but greater military success did not appear to follow as

restrictions were eased. The President eased bombing restrictions during the 1966 POL

campaign, but despite military assurances to the contrary, the POL campaign neither

affected significantly the war in the South nor prompted the enemy to negotiate.

According to James Clay Thompson, "Almost all the restrictions were lifted ... and almost

every target of military value, as defined by the military, was attacked and either destroyed

or damaged by December 1967." Thompson concluded, "Proponents of escalation argued

that the next step up the ladder would prove decisive. Each step, however, had failed to

be decisive and the war was now extremely costly, with no prospect of ending."[1] Other

skeptical commentators concluded, "There is no basis to saying with any certainty that

airpower unfettered by political considerations could have 'won' the war in Vietnam."[2]

Nevertheless, military leaders resisted the idea that Rolling Thunder was failing. They may

have had difficulty adjusting to conditions less permissive than all-out war and were not

very receptive to subtle strategies aimed at limited political objectives, but the

commanders were not as stubborn or blind as some critics have implied.

Unlike the air commanders, the Johnson Administration had definite, if unsound,

ideas about how to apply air power in carefully controlled doses to achieve limited

political purposes, but recognizing their policy's success or failure was another matter.

Secretary McNamara and other civilian officials were less attuned to bombing's technical

and theoretical potentialities, but more focused on its political dimensions than were the

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[1] James Clay Thompson, Rolling Thunder: Understanding Policy and Program Failure (Chapel Hill, NC: The Univ. of North Carolina Press, 1980), pp. 71 and 52.

military chiefs. The administration saw bombing as a way to bolster South Vietnamese

morale, demonstrate American resolve, and send other political messages, all of which

were obviously difficult to measure. Those political benefits would supposedly accrue

without the extensive first and second order damage military leaders deemed prerequisites

to third order success. The administration deemed destruction of enemy war-making

facilities a secondary concern that was undesirable if it outraged Soviet or Chinese

sensibilities. Third order success in an air war deliberately designed to minimize bomb

damage proved hard to detect, but McNamara and other administration officials spent

years pursuing a strategy opposed by military commanders.

Strategy disputes occur in every war, but the festering clash between military

commanders and the Secretary of Defense about bombing effectiveness was troubling.

The consequent political maneuvering and unreconciled differences of opinion about

bombing's effectiveness contributed to ineffective air power application during Rolling

Thunder. Instead of following a coherent policy, the U.S. chose a compromise that had

little chance of working. There is no way to know if a massive and sudden bombing

campaign would have won the war as many Rolling Thunder veterans have claimed.

Military officials consistently portrayed bombing as only one element of an overall strategy

and did not claim it would win single-handedly. Deciding which air strategy the U.S.

should have used is beyond the scope of this discussion, but the strife between military and

civilian leaders contributed to confusion about how to recognize and chart bombing's

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[2] Raphael Littauer and Norman Uphoff, eds., The Air War in Indochina, (Boston: Beacon, 1972), p. 36.

contribution to the American war effort. If the military's recommended strategy had been tried, the campaign's results might have been better than what actually happened, but there is no assurance that such a strategy would have succeeded.

President Nixon's Linebacker I and II bombing campaigns of 1972 have invited speculation about the results Rolling Thunder might have achieved if President Johnson had permitted a more forceful campaign, but historian Mark Clodfelter has shown that comparing the two Linebackers with Rolling Thunder can be misleading. Claims that the Linebacker campaigns vindicated bombing's effectiveness are deceptive because American political goals had changed since early 1968. By 1972, the goals had shrunken from guaranteeing South Vietnamese independence to finding an honorable way to withdraw from the war. Linebacker I air strikes against North Vietnam's "Easter Offensive" mechanized invasion were quite different from Rolling Thunder's attacks against dispersed infiltration routes. Linebacker I aerial interdiction was generally more profitable than its Rolling Thunder counterpart because motorized forces required much more fuel, munitions, and other supplies than VC guerrillas or NVA infantry units. Although most military leaders believed that the Linebacker II "Christmas bombing" strikes against Hanoi by B-52s had broken Hanoi's will and ability to continue fighting and showcased the results Rolling Thunder might have achieved if the military had been given a freer rein in 1965, the Communists did not renounce their longstanding goals of overthrowing the Saigon regime and unifying both Vietnams under Hanoi's leadership. Hanoi merely agreed to return American prisoners of war, allow remaining American forces to

withdraw, and wait a decent interval before taking over the South. Since bombing effectiveness is inextricably linked with the objectives bombing is supposed to achieve, saying that the Linebacker campaigns would have achieved Rolling Thunder's objectives is an oversimplification.[3] The techniques used to assess bombing are only partially determined by the objectives sought. Comparing the Air Force's Rolling Thunder bombing effectiveness assessment methods and criteria with those used during the Linebacker campaigns would require a detailed study of the Linebacker campaigns, but such a comparison is not the purpose of this work.

Ideally, the right information about Rolling Thunder's results might have resolved strategy disagreements, but explaining why that information was either overlooked or ignored raises some unpleasant possibilities. Disputes about evaluating bombing results were only partly due to an absence of data. Data were probably more plentiful than in previous wars, yet abundant information did not translate into better comprehension of events. Previously, American bombing had proceeded on little more than a faith that the attacks must be hurting the enemy somehow. Post war investigations such as the United States Strategic Bombing Survey (USSBS) after World War II answered many questions about bombing's effects that had been simply imponderable during wartime. Strategic Bombing Survey investigators enjoyed extensive access to bombed areas, enemy records, and enemy leaders – sometimes before the war had even ended. Postwar USSBS-style ground examination of North Vietnam was impossible, and Hanoi's archives are still

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[3] Mark Clodfelter, The Limits of Airpower: The American Bombing of North Vietnam, (New York: The Free Press, 1989), chapters III and VII.

unavailable, so many questions about Rolling Thunder's effectiveness remain unanswered. Nevertheless, decision makers still had access to tremendous amounts of data.

Despite the mass of material available, there was no such thing as pure, impartial effectiveness information upon which rational decisions could be made. Whether quantifiable or not, various forms of data can be valid guides to action, but part of what passed for effectiveness data was propaganda supporting a predetermined preferred strategy rather than information to support impartial decisions. There is no reason to believe Rolling Thunder was unique in that respect, but the problem was notably prominent during that campaign. The military sought justifications for a less restricted bombing policy while the administration sought justifications for a graduated strategy.

Even when citing the same data, civilian and military officials often interpreted it differently. Civil-military disagreements were so prevalent that contending officials can be described as being on different "sides" of a strategy debate. Depending on who reported it, lack of enemy damage repair meant either that the damage was unimportant or that enemy resources were stretched too thin to permit repairs. Both sides tracked numbers of targets destroyed, but used the same statistics to justify opposite conclusions. Intel reports such as the CIA/DIA Appraisals often hedged their conclusions with remarks either side might like. Meanwhile, both sides de-emphasized data that conflicted with both strategy variants - such as the cost of enemy facilities destroyed versus the cost of U.S. planes lost. When effectiveness data were harnessed to contending partisan disputes,

genuinely revealing indicators of bombing's effectiveness (if there was any such thing) receded into the background.

As they strove to prove their preferred bombing strategy was the best, leaders devised clever, but not necessarily appropriate criteria for judging success. Proper effectiveness measurement demands accurate understanding of what is to be measured, but some criteria seemed designed to win arguments rather than to assess bombing. Military and civilian officials adopted criteria they might not ordinarily have used without the ongoing disputes about how to perform and assess the bombing. The ceaseless wrangling about target lists was one example.

Some criteria generated confusion between the campaign's offensive and defensive purposes. Despite labeling Rolling Thunder an offensive operation, air leaders placed considerable emphasis on judging success by how well it served defensive ends such as reducing troop requirements and casualties in the South. Portraying bombing as the offensive facet of U.S. strategy in Vietnam while justifying it in largely defensive terms misdirected effectiveness measurements. Commanders considered the ground war in the South defensive so the bombing was in essence defending a defensive campaign. Instead of charting progress toward victory, the military charted progress toward avoiding defeat.

Other difficulties arose when unprovable assertions, such as bombing's alleged disruption of enemy plans, diverted effectiveness measurement into a speculative realm, obscuring failings that might have been more evident had more provable effects been emphasized instead. The vagueness of some criteria such as foiling suspected enemy

intentions and saving lives may have helped "sell" bombing, but fostered multiple

interpretations about actual progress. Claiming bombing worked because it prevented the

enemy from launching larger attacks was hard to substantiate, but its very indefiniteness

enabled advocates to claim success in preventing something that may not have happened

anyway. Justifying bombing success with such evidence made air power claims seem

based more on faith than on verifiable facts. Even the most numerically oriented leaders

like Secretary McNamara were willing to seek political shelter behind such problematic

criteria. However, senior leaders are never perfectly rational or impartial, so they could

hardly have avoided emphasizing those data that tended to support their preconceived

views. Blaming Rolling Thunder's outcome on leaders who applied unprovable

effectiveness criteria would be only a partial explanation.

Some observers have said the U.S. tried to measure too much during Rolling

Thunder. Air leaders did use impressive statistics to argue victory was inevitable, even if

not imminent. Admiral Sharp called the Vietnam War "the most computerized, and most

statistically analyzed in history" because of "the necessity to measure the progress of a war

in which there were no clearly drawn battle lines - no front, no safe area."[4] One observer

of the war felt, "Perhaps the major error in the conduct of the war was that key decisions

were based too heavily on those kinds of military activity which could be counted,

calculated, and computerized."[5] Flying unit members complained about burdensome and

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[4] Adm. U. S. G. Sharp, and Gen. W. C Westmoreland, Report on the War in Vietnam (as of 30 June 1968), (Washington, D.C.: U.S. Gov't Printing Office, 1969), p. 1.
[5] Arthur Ross, "The Data Game," in Charles Peters and Timothy J. Adams, eds., Inside the System, (New York: Praeger, 1970), p. 265.

inflexible methods of reporting mission results and the difficulty of obtaining feedback from headquarters about their bombing results. Headquarters attempts to obtain more information by demanding ever more time-consuming reports sometimes backfired when harried flying unit personnel found ways to evade requirements they deemed unreasonable by reporting "no flak observed" or "no BDA due to smoke and dust."

Blaming American inability to measure bombing effectiveness on excessive quantification is an oversimplification, however. Secretary McNamara was exceptionally oriented toward numerical techniques such as systems analysis, but the Johnson Administration sought some unquantifiable results such as boosting South Vietnamese morale and putting a high price tag on Hanoi's attacks. The administration chose bombing policy and objectives as well as some of the criteria for judging success or failure. The military was doubtful about criteria such as deterrence and the enemy's willingness to negotiate, but ended up appropriating them anyway. Military leaders proved nearly as adept as administration officials at devising intricate and questionable ways of measuring success. Misuse of data that may or may not have constituted valid effectiveness measurements helped obscure Rolling Thunder's actual degree of success.

Military and civilian leaders both contributed to bombing's ineffectiveness. Experienced officers misled themselves and everyone else about the campaign's progress. They were frustrated by political restrictions, yet their apparent desire to accentuate success and downplay failure in a discouraging war generated overly optimistic appraisals of the campaign's prospects. Few senior officers acknowledged how ineffective the

campaign had been even after the enemy launched the Tet Offensive. Many continued to claim bombing had achieved most of its objectives, imposed costs, or been otherwise technically successful according to limited criteria long after the campaign had ended.

The generals' insistence that bombing was effective, yet falling short of its full potential due to political restrictions might also have confused efforts to assess the campaign's results. Air power advocates have frequently advertised bombing as a faster route to victory than alternative methods, but practically abandoned that claim during Rolling Thunder. Military leaders proved willing to tolerate a gradual increase in the number of authorized targets. Their accommodation to administration strategy initially may have been designed to give bombing an opportunity to gain some indisputable success that could then be used as leverage to gain approval for more bombing which would presumably snowball into even greater success. The disappointing POL campaign dashed those hopes. The notion that limited bombing would eventually succeed once the President approved enough targets backfired. The Johnson Administration considered gradual military progress acceptable - even preferable - to dramatic victory, so the generals' calls for more bombing sounded unconvincing.

Secretary McNamara's conduct was even less creditable. He was increasingly skeptical about bombing, but endorsed its gradual expansion anyway, partly justifying his actions by noting, "each of them [JCS members] firmly believes that we are winning and will continue to win."[6] His actions suggested a willingness to expend lives pursuing a

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[6] U.S. Congress, Senate, Committee on Armed Services, Air War Against North Vietnam, Hearings before the Preparedness Investigating Subcommittee, 90th Cong., 1st sess., Part 4, Aug. 25, 1967, p. 301.

policy in which he had little confidence. For a while, McNamara found himself in a no-lose situation. If tightly restricted bombing had succeeded, he could have claimed credit for applying the minimum amount of force, minimizing the risk of superpower confrontation, and sacrificing the minimum number of lives. If it had failed, he could have blamed the military experts who had repeatedly assured everyone bombing would win the war while portraying himself as the one who had saved lives by disapproving futile, reckless demands for even more bombing. The generals' overly optimistic assessments and forecasts helped Secretary McNamara outmaneuver them politically by ignoring their advice while using their own claims of overall success to discredit them. Ultimately, McNamara concluded the war was not winnable and resigned effective February 29, 1968.

Personalities and biases probably impeded bombing assessment. Secretary of Defense McNamara's intellectual arrogance may have clouded his judgment about how best to chart air war progress. He had calculated bombing results as a systems analyst during World War II, but his proven ability as a captain of industry seems to have convinced him he knew more about air warfare than his generals. Business by the numbers may succeed, but successful aerial warfare demands more than meticulous cost-benefit analyses and precisely apportioned uses of force to transmit political signals. Bombing was a blunt instrument ill suited to finely tuned use.

Near the end of Rolling Thunder's first year, an administration official made a prescient analysis. Undersecretary of State George Ball wrote, "a sustained bombing

program acquires a life and dynamism of its own," because, among other things, the

"philosophy of bombing requires gradual escalation." As Ball explained,

> Admittedly, we have never had a generally agreed rationale for bombing
> North Viet-nam. But the inarticulate major premise has always been that
> bombing will somehow, some day, and in some manner, create pressure on
> Hanoi to stop the war. This is accepted as an article of faith, not only by
> the military who have planning and operational responsibilities but by most
> civilian advocates of bombing in the Administration.
> Yet it is also widely accepted that for bombing to have this desired political
> effect, we must gradually extend our attack to increasingly vital targets.[7]

Ball thought those vital targets included Haiphong harbor, POL supplies, electrical

plants, airfields, and SAM sites. He believed that unless the U.S. achieved dramatic

results in the South, "we will be led by frustration to hit increasingly more sensitive

targets" in the North. He added, "Each extension of our bombing to more sensitive areas

will increase the risk to our aircraft and compel a further extension of bombing to protect

the expanded bombing activities we have staked out."[8] The creeping escalation without

decisive results Ball feared did occur, but senior officials were slow to accept the

campaign's inability to accomplish desired goals.

Although Rolling Thunder was a troubled campaign, there were some bright spots.

The USAF has always found bombing effectiveness measurement difficult, but the

problem may have been no worse than during previous wars. In World Wars I and II,

U.S. planes had attacked the wrong cities without the Americans even discovering some

of those mistakes until after the war. Improved navigation equipment made bombing the

[7] Memo, G. Ball to the President, Jan. 25, 1966, U.S. Department of Defense, United States - GVN Relations, (Washington, D.C.: Gov't Printing Office, 1972), IV.C.7.(a), vol. I, p. 47. (Cited hereafter as "Pentagon Papers.")

wrong places less common during Rolling Thunder than before. Close political scrutiny demanded accurate accounting of bombs and targets, probably helping counteract duplicated and contradictory damage claims. Contrary to myth, air commanders did not blindly track the campaign's progress by counting sorties and bombs.

Air Force bombing assessment during Rolling Thunder was a sophisticated, subtle, and imperfect process. The assessment techniques used were probably no worse than those used in other wars, and there is little reason to believe sloppy measurement *per se* caused bombing results to fall short of expectations. The generals could not make policy, but only advised the administration. Although they slanted their data in ways calculated to persuade the administration to accept their advice, they do not appear to have lied or distorted the facts. The commanders had few viable alternatives to the course they followed. Resigning their posts to protest administration policy might have attracted some temporary publicity, but may not have changed the policy. Rather than highlighting the campaign's meager successes, the generals might instead have emphasized its more obvious failings, but such expectations may have been unrealistic for men who had built careers by overcoming obstacles and winning wars. Even the sternest military critics, such as General Meyers, saved most of their criticisms until after they had retired.

Perfect effectiveness measurement does not guarantee victory, but misreading signs of failure can open the door to criticism in case of defeat. If the U.S. had lost World War II, blunders like the long delay in providing escort fighters during bombing missions

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[8] Memo, G. Ball to the President, Jan. 25, 1966, Pentagon Papers, IV.C.7.(a), vol. I, p. 48.

over Europe might have been criticized much the way Rolling Thunder is criticized today.

Second World War American air leaders also seriously underestimated the vulnerability of

the German electric supply system. War is inherently confusing and victory has a way of

obscuring the mistakes that mark even successful campaigns, but U.S. military leaders

overestimated Rolling Thunder's effectiveness. After Vietnam, some air leaders changed

their opinions and claimed to have foreseen and warned of failure. Rolling Thunder may

not have been what Adm. Sharp subsequently labeled "perhaps the most flagrant misuse of

air power in its brief history,"[9] but more a case where expectations of success were dashed

by defeat unlike previous wars where the glow of victory overshadowed major errors.

One caveat accompanies these conclusions. This work is a case study linking

Rolling Thunder's objectives and strategy to the bombing assessment methods and criteria

the USAF and other agencies used. Some concepts may be valid for other campaigns, but

others may be context specific. Effectiveness is most meaningfully expressed in

conjunction with specific objectives. Extrapolating concepts from a single case study and

applying them universally may prove to be a mistake.

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[9] Adm. U. S. G. Sharp, <u>Strategy for Defeat: Vietnam in Retrospect</u>, (Novato, CA: Presidio Press, 1978), p. xii.

GLOSSARY

AAA	Anti-Aircraft Artillery, same as flak
AD	Air Division – USAF organization smaller than a Numbered AF
AF	Air Force, or a Numbered Air Force as in Seventh AF
AFHRA	Air Force Historical Research Agency (US Air Force archives)
BDA	Bomb Damage Assessment
CAP	Combat Air Patrol
CBU	Cluster Bomb Unit
CEP	Circular Error Probable – a bombing accuracy statistic
CHECO	Various meanings – initially, Contemporary Historical Evaluation of Counterinsurgency Operations, later, Contemporary Historical Examination of Combat Operations, finally, Contemporary Historical Examination of Current Operations
CIA	Central Intelligence Agency
CINCPAC	Commander-in-Chief, Pacific Command (PACOM)
COACT	Combat Activities Report – computerized data input form
COMUSMACV	Commander, U.S. Military Assistance Command Vietnam
Corona Harvest	Air Staff program to derive lessons learned from Vietnam War
CTF	[Aircraft] Carrier Task Force
CTFL	Central Target Folder Library (at 7th AF)
DIA	Defense Intelligence Agency
DMZ	Demilitarized Zone – SVN/NVN border at 17° North latitude
DOD	Department of Defense
DRV	Democratic Republic of Vietnam (North Vietnam)
ECM	Electronic Countermeasures
FAC	Forward Air Controller
Flak	Anti-aircraft guns, same as AAA
Frag	Fragmentary orders
Intel	Intelligence – either the data itself or the people who handled it
IPIR	Immediate Photo Interpretation Report – see SUPIR
IR	Infrared
JCS	Joint Chiefs of Staff, located at Pentagon
KBA	Enemy troops Killed By Air attacks
KCAS	Knots Calibrated Airspeed
LOC	Line of Communication – roads, railroads, waterways, etc.
MACV	Military Assistance Command Vietnam
MT	Metric Ton
NVA	North Vietnamese Army – regular army as distinguished from VC

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NVAF	North Vietnamese Air Force
NVN	North Vietnam
OHI	Oral History Interview
OPREP-4	Operational Report that tells mission results
PACAF	Pacific Air Forces, USAF component of PACOM
PACOM	Pacific Command, joint Army, Navy, & AF HQ
PI	Photo Interpreter or Photo Interpretation
POL	Petroleum, Oil, and Lubricants
Recce	Reconnaissance
RP	Route Package
RT	Rolling Thunder
RTTL	Rolling Thunder Target List
RVN	Republic of Vietnam – *i.e.* South Vietnam. See SVN
SAC	Surface-to-Air Missile
SAM	Strategic Air Command
SEA	Southeast Asia
SLAR	Side Looking Airborne Radar
SRW	Strategic Reconnaissance Wing
SUPIR	Supplemental Photo Interpretation Report – see IPIR
SVN	South Vietnam. See RVN
TFS	Tactical Fighter Squadron
TFW	Tactical Fighter Wing – composed of TFS and possibly other types of squadrons
TRW	Tactical Reconnaissance Wing
USAF	United States Air Force
VC	Viet Cong (alternately, Vietcong or Viet-cong) – guerrillas in SVN
VNAF	South Vietnamese Air Force

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